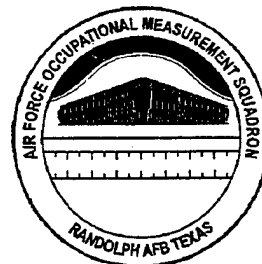




**UNITED STATES
AIR FORCE**



OCCUPATIONAL SURVEY REPORT



UTILITIES SYSTEMS

AFSC 3E4X1

OSSN: 2360

AUGUST 1999

**OCCUPATIONAL ANALYSIS PROGRAM
AIR FORCE OCCUPATIONAL MEASUREMENT SQUADRON
AIR EDUCATION and TRAINING COMMAND
1550 5th STREET EAST
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PREFACE

This report presents the results of an Air Force Occupational Survey of the Utilities Systems career ladder, Air Force Specialty Code (AFSC) 3E4X1. Authority for conducting occupational surveys is contained in AFI 36-2623. Computer products used in this report are available for use by operations and training officials.

The survey instrument was developed by Second Lieutenant Tyson Frerking. Computer programming support was provided by Mrs. Karen Tilghman and Ms. Dolores Navarro provided administrative support. Second Lieutenant Floyd H. Brazier analyzed the data and wrote the final report. This report has been reviewed and approved by Lieutenant Colonel Roger W. Barnes, Chief, Airman Analysis Section, Occupational Analysis Flight, Air Force Occupational Measurement Squadron (AFOMS).

Copies of this report are distributed to Air Staff sections, major commands, and other interested training and management personnel. Additional copies are available upon request to AFOMS/OMYXI, 1550 5th Street East, Randolph Air Force Base, Texas 78150-4449, or by calling DSN 487-5543. For information on the Air Force occupational survey process or other on-going projects, visit our web site at <http://www.omsq.af.mil>.

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SUMMARY OF RESULTS

1. **Survey Coverage:** The Utilities Systems career ladder was surveyed to provide current job and task data for use in updating career ladder documents and training programs. Survey results are based on 1,325 responses from Active Duty (AD) (884), Air National Guard (ANG) (293), and Air Force Reserve Command (AFRC) (148) personnel. Skill levels and paygrades were well represented.
2. **Specialty Jobs:** One cluster and 11 jobs were identified in the career ladder structure analysis: General Plumber Cluster, Exterior Plumbing Job, Barebase Systems Installation Job, Barebase Systems Maintenance Job, Field Water Systems Job, Water Treatment Job, Pool Maintenance Job, Fire Suppression Job, Team Leader Job, OJT Trainer Job, and Management and Supervisory Job.
3. **Career Ladder Progression:** Personnel in the AFSC 3E4X1 career ladder follow a typical career progression pattern. Inexperienced personnel perform technical work in the General Plumber Cluster. More experienced personnel perform technical and training functions in support of these same operations, as well as also doing all of the technical tasks that are done by the less-experienced personnel. Experienced personnel perform mostly supervisory and managerial functions rather than specializing in the technical tasks.
4. **Training Analysis:** Matched survey data to the AFSC 3E4X1 Specialty Training Standard (STS) revealed a document that was well supported by survey respondents. All but four of the 104 proficiency-coded items in the 3E4X1 STS were well supported by survey respondents. Analysis of the 3E4X1 Plan of Instruction (POI) also revealed a document that is well supported by the career field as all performance coded learning objectives, with the exception of two items (out of 43), exceeded standards. Training personnel and career field managers are to be commended for producing an STS and POI that are well supported by the field. However, there are a few unreferenced tasks that should be reviewed by training and functional personnel for possible training code increase in the STS and inclusion in the POI.
5. **Job Satisfaction:** Overall, AFSC 3E4X1 members appear satisfied with their jobs. No serious job satisfaction problems appear to exist within the AFSC 3E4X1 career ladder. This holds true for AD, ANG, and AFRC members. The only exception is the perception that members are unable to fully utilize their training and talents.
6. **Implications:** Survey results clearly indicate that the present classification structure, as described in the latest specialty description, accurately portrays the jobs performed in this career ladder. Specialty Job Analysis indicates no big changes have occurred in AFSC 3E4X1 over the past 4 years with the exception of some added field and barebase taskings. Based on survey data, the career ladder training documents are accurately supported by percent members performing data as well as task factor ratings. Training personnel will want to look at the four unsupported STS items and the two unsupported POI objectives as well as the extensive task not referenced list to see if any of the unreferenced tasks warrant inclusion into the formal course training.

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**OCCUPATIONAL SURVEY REPORT (OSR)
UTILITIES SYSTEMS
(AFSC 3E4X1)**

INTRODUCTION

This is an Air Force Occupational Measurement Squadron occupational survey report (OSR) of the Utilities Systems (AFSC 3E4X1) career ladder. In October 1992, the 552X5 (Plumbing), and the 566X1 (Environmental Support) merged to form the present 3E4X1 Utilities System career field. This survey, completed in 1999, is intended to update the current database and to identify any changes that may have taken place since the last survey in 1995. Survey data will be used to identify current utilization patterns among career ladder personnel and evaluate career ladder documents and training programs.

Background

As described in the AFMAN 36-2108, *Airman Classification, Specialty Description*, dated 31 October 1998, Utilities Systems personnel install, inspect, repair, and manage water and wastewater distribution systems and components, storm and sanitary sewage collection systems, and gas distribution systems while complying with environmental and safety regulations.

Personnel entering the AFSC 3E4X1 career ladder must attend J3ABR3E431-003 Utilities Systems Apprentice course at Sheppard AFB TX, lasting 7 weeks and 2 days. This course includes an introduction to water processing; water analysis; operating principles of water treatment plants; maintenance of water and wastewater processing system components; operating principles, configuration, construction, maintenance, and repair of water supply systems, waste systems, and natural gas systems. It also includes installing fixtures; faucets; valves; appurtenances; use and maintenance of tools and equipment; installation and removal of backflow prevention devices; and training on contingency operations. Upon completion of this course, the graduate is awarded the 3-skill level.

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SURVEY METHODOLOGY

Inventory Development

The data collection instrument for this occupational survey was USAF Job Inventory (JI) Occupational Survey Study Number (OSSN) 2360, dated November 1998. A tentative task list was prepared after reviewing pertinent career ladder publications and directives, pertinent tasks from the previous survey instrument, and data from the last OSR. The preliminary task list was refined and validated through personal interviews with 24 subject-matter experts (SMEs) at the following training location and operational installations:

<u>BASE</u>	<u>UNIT VISITED</u>
Sheppard AFB TX	366 TRS
Travis AFB CA	60 CES
Grand Forks AFB ND	319 CES
Whiteman AFB MO	509 CES
Hurlburt Field FL	823 RHS

The resulting JI contains a comprehensive listing of 1053 tasks grouped under 22 duty headings, and a background section requesting information such as grade, base, MAJCOM assigned, organizational level, component status, job title, functional area, work schedule, test equipment used or operated, and support equipment used or operated.

Survey Administration

From January 1999 through May 1999, base training offices at operational units worldwide administered the inventory to eligible AFSC 3E4X1 personnel. Job incumbents were selected from a computer-generated mailing list obtained from personnel data tapes maintained by the Air Force Personnel Center, Randolph AFB TX.

Each individual who completed the inventory first completed an identification and biographical information section and then checked each task performed in his or her current job. After checking all tasks performed, each member then rated each of these tasks on a 9-point scale, showing relative time spent on that task, as compared to all other tasks checked. The ratings ranged from 1 (very small amount time spent) through 5 (about average time spent) to 9 (very large amount time spent).

To determine relative time spent for each task checked by a respondent, all of the incumbent's ratings are assumed to account for 100 percent of his or her time spent on the job and are summed. Each task rating is then divided by the total task ratings and multiplied by 100 to provide a relative percentage of time for each task. This procedure provides a basis for comparing tasks in terms of both percent members performing and average percent time spent.

Survey Sample

Personnel were selected to participate in this survey so as to ensure an accurate representation across major commands (MAJCOMs) and military paygrade groups. All eligible AFSC 3E4X1 personnel were mailed survey disks. Members eligible for the survey consisted of the total assigned 3-, 5-, and 7-skill level population, excluding the following: (1) hospitalized personnel; (2) personnel in transition for a permanent change of station; (3) personnel retiring within the time the inventories were administered to the field; and (4) personnel in their job less than 6 weeks. Table 1 reflects the percentage distribution, by MAJCOM, of assigned AFSC 3E4X1 personnel as of October 1998. The 1325 respondents in the final sample represent 46 percent of the total assigned personnel and 50 percent of the total surveyed personnel. Table 2 reflects the paygrade distribution for these AFSC 3E4X1 personnel.

Both Command and Paygrade distribution of the survey sample are close to the percent assigned. This indicates the sample is a true representation of the career ladder population.

Task Factor Administration

Job descriptions alone do not provide sufficient data for making decisions about career ladder documents or training programs. Task factor information is needed for a complete analysis of the career ladder. To obtain the needed task factor data, selected senior AFSC 3E4X1 personnel (generally E-6 or E-7 craftsmen) also completed a second booklet for either training emphasis (TE) or task difficulty (TD). These booklets were processed separately from the job inventories. This information is used in a number of different analyses discussed in more detail within the report.

Training Emphasis (TE): The 51 senior NCOs who completed a TE booklet were asked to select tasks they felt require some sort of structured training for entry-level personnel and then indicate how much training emphasis these tasks should receive, from 1 (extremely low emphasis) to 9 (extremely high emphasis). Structured training is defined as training provided at resident training schools, field training detachments (FTDs), mobile training teams (MTTs), formal on-the-job-training (OJT), or any other organized training method. Interrater reliability for these 51 raters was acceptable. For this specialty, the average TE rating was 2.25, and the standard deviation was 1.38. Tasks rated high in TE are those which are rated 3.63 and above.

Task Difficulty (TD): The 63 senior NCOs who completed TD booklets were asked to rate the difficulty of each task using a 9-point scale (extremely low to extremely high). Difficulty is

defined as the length of time required for the average incumbent to learn how to perform the task. Ratings were standardized so tasks have an average difficulty of 5.00 and a standard deviation of 1.00. Any task with a TD rating of 6.00 or above is considered to be difficult to learn. Interrater reliability for the 63 TD raters was acceptable.

When used in conjunction with the primary criterion of percent members performing, valid task factor data can provide insight into first-enlistment personnel training requirements. Such insights may suggest a need for lengthening or shortening portions of instruction supporting entry-level jobs.

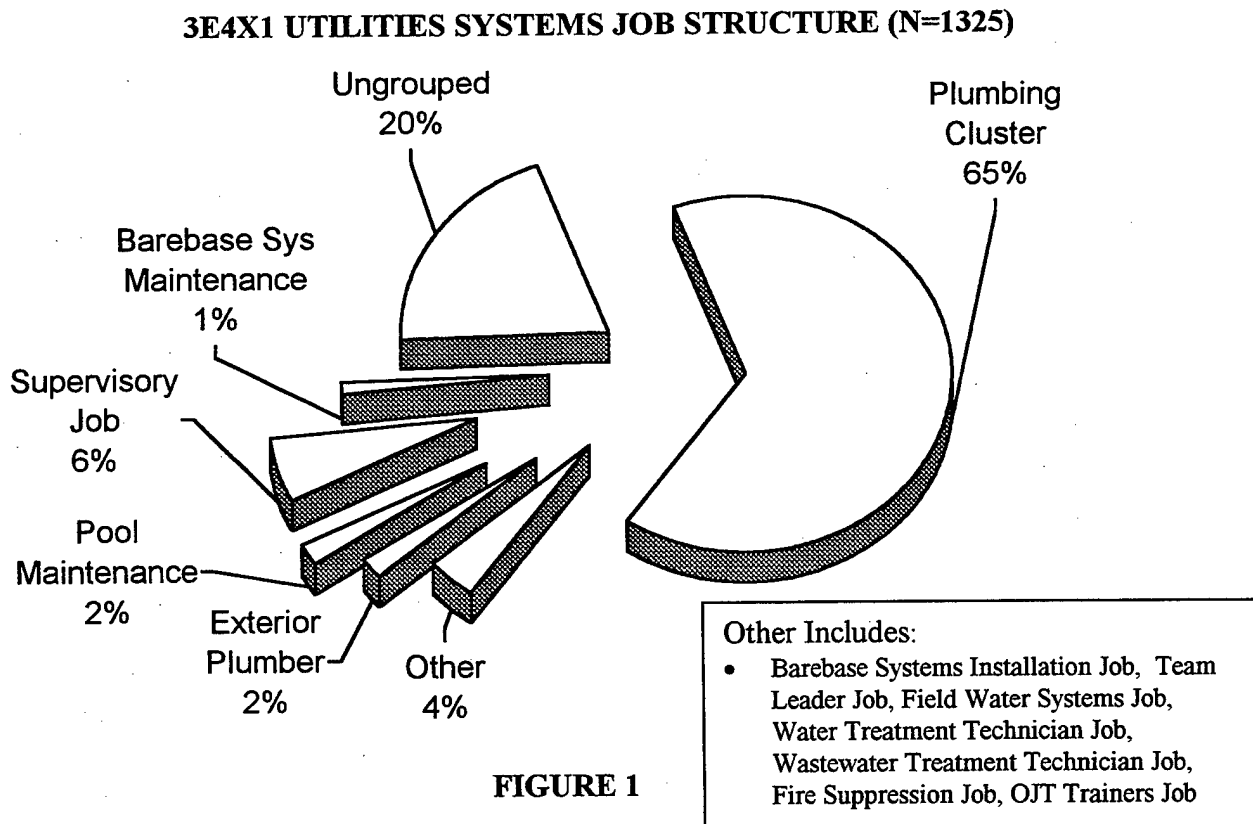
SPECIALTY JOBS

The first step in the analysis process is to identify the structure of the career ladder in terms of the jobs performed by the respondents. The Comprehensive Occupational Data Analysis Program (CODAP) assists by creating an individual job description for each respondent based on the tasks performed and relative amount of time spent on these tasks. The CODAP automated job clustering program then compares all the individual job descriptions, locates the two descriptions with the most similar tasks and time spent ratings, and combines them to form a composite job description. In successive stages, CODAP either adds new members to this initial group, or forms new groups based on the similarity of tasks and time spent ratings.

The basic group used in the hierarchical clustering process is the Job. When two or more jobs have a substantial degree of similarity, in tasks performed and time spent on tasks, they are grouped together and identified as a Cluster. The structure of the career ladder is then defined in terms of jobs and clusters of jobs.

Overview of Specialty Jobs

Based on the analysis of tasks performed and the amount of time spent performing each task, one cluster and 11 jobs were identified within the AFSC 3E4X1 career ladder. Figure 1 illustrates the jobs and clusters performed by these personnel.



A listing of the cluster and jobs is provided below. The stage (STG) number shown beside each title references computer printed information, the letter "N" indicates the number of personnel in each group.

- I GENERAL PLUMBER CLUSTER (STG168, N=861)
 - A INTERIOR PLUMBING JOB (STG213, N=218)
 - B NCOIC JOB (STG226, N= 41)
 - C GENERAL PLUMBER JOB (STG201, N= 594)
- II EXTERIOR PLUMBING JOB (STG237, N=30)
- III BAREBASE SYSTEMS INSTALLATION JOB (STG280, N=7)
- IV BAREBASE SYSTEMS MAINTENANCE JOB (STG225, N=13)
- V FIELD WATER SYSTEMS JOB (STG215, N=12)
- VI WATER TREATMENT TECHNICIAN JOB (STG203, N=5)
- VII WASTEWATER TREATMENT JOB (STG141, N=5)
- VIII POOL MAINTENANCE JOB (STG148, N=22)
- IX FIRE SUPPRESSION JOB (STG240, N=8)
- X TEAM LEADER JOB (STG162, N=6)
- XI OJT TRAINERS JOB (STG155, N=6)
- XII MANAGEMENT AND SUPERVISORY JOB (STG208, N=78)

The respondents forming these jobs and clusters account for 94 percent of the survey sample. The remaining 6 percent, for one reason or another, did not group into one of these jobs or clusters. Examples of job titles for these personnel include Utilities System Superintendent, Utilities Foreman, Work Scheduler, Structural Specialist Craft Team Leader, and NCOIC of Planning.

Group Descriptions

The following paragraphs contain brief descriptions of the cluster and jobs identified through the career ladder structure analysis. Table 3 presents the relative time spent on duties by members

of these specialty jobs and clusters. Selected background data for these jobs and clusters are provided in Table 4. Representative tasks for all the groups are contained in Appendix A.

I. EXTERIOR PLUMBING JOB (STG237). The 30 airmen forming this job (2 percent of the survey sample) perform an average of 119 tasks and represent the entry-level job of this career field. Exterior Plumbers spend 30 percent of their time performing Duty B, Installing or Replacing Pipe, Tubing, Fittings, or Appurtenances, and 17 percent of their time performing Duty A, Performing General Operations or Maintenance. In addition they spend 15 percent of their time performing Duty D, Maintaining Valves, and another 11 percent of their time performing Duty E, Maintaining Water Distribution Systems (see Table 3). The top 10 tasks performed by the members of this job include:

- Backfill trenches
- Measure pipe
- Locate water mains using base maps
- Locate and identify underground balves using base utilities maps
- Repair water main valves
- Maintain shop equipment
- Cut plastic pipe or tubing
- Guide backfill of trenches
- Maintain hand tools
- Remove or install valve boxes
- Lower Pipe into trenches manually
- Open clogged or restricted sewers using high-pressure water equipment

Representative task modules for this job include:

<u>TM</u>	<u>Module Title</u>	<u>No. Of Tasks</u>	<u>Percent Time Spent</u>	<u>Average Percent Members Performing</u>
0006	Valve Boxes	7	6	74
0007	Sewer Lines	5	4	65
0001	Pipe and Tubing	24	16	63
0005	Hydrants	10	5	60
0002	Drain Unclogging	7	3	50
0003	Valves	14	5	44

Task module analysis shows that the Exterior Plumbing Job members spend the majority of their time working with water distribution systems that are generally maintained outside.

The predominant paygrade of this job is E-3 and E-4 (see Table 4), averaging less than 3 years in the career field and 4 years TAFMS. Fifty-seven percent report holding the 3-skill level while 43 percent report holding the 5-skill level, showing a relatively young job population.

Furthermore, only 13 percent indicate supervising others, 37 percent are assigned overseas, and all members are AD airmen.

II. GENERAL PLUMBER CLUSTER (STG168). The 861 airmen performing within this cluster (65 percent of the survey sample) represent the core of the career ladder. This is evident not only by the population of this cluster, but also by the amount of time that is spread across the various duty titles. Such as, spending 20 percent of their time on Duty B, 17 percent on Duty A, 13 percent on Duty D, and another 10 percent of their time performing Installing or Maintaining Plumbing Fixtures and Equipment tasks of Duty C (see Table 3). Three jobs were identified in this cluster: Interior Plumbing Job, NCOIC Job, and General Plumber Job; they will be discussed below. The average number of tasks performed by this group is 266, more than twice that of the less experienced Exterior Plumbing Job. In addition, at first inspection, the Duty headings of the General Plumber Cluster and Exterior Plumbing Job are quite similar. However, at closer inspection, the different tasks that these two groups perform, show that they are performing two distinct Jobs. Distinctive tasks performed include:

- Remove or install flushometers
- Remove or install urinals
- Measure pipe
- Cut copper pipe or tubing
- Open clogged or restricted drains using power-operated augers
- Assemble plastic pipe using solvent weld joints
- Cut plastic pipe or tubing
- Open clogged or restricted drains using hand-operated augurs
- Assemble copper tubing using sweat solder
- Inspect plumbing fixtures
- Assemble or disassemble threaded pipe fittings
- Ream piping or tubing

Representative task modules for this cluster include:

<u>TM</u>	<u>Module Title</u>	<u>No. of Tasks</u>	<u>Percent Time Spent</u>	<u>Average Percent Members Performing</u>
0001	Pipe and Tubing	24	10	81
0002	Drain Unclogging	7	4	78
0003	Valves	14	4	73
0004	Cut Openings	8	2	63
0006	Valve Boxes	7	2	54

Task module analysis shows that they do not spend a great deal of time on any one area or specialty. Members of this job are called on to do almost anything and everything that is involved with plumbing on Air Force installations.

Fifty-three percent of these airmen hold the 5-skill level, 28 percent the 3-skill level, and 19 percent the 7-skill level. These members average over 7 years TAFMS and the predominant paygrade is E-4/5. Sixty-two percent of this core cluster are career personnel, revealing an older and more experienced group. Seventy percent of the members of this cluster are AD airmen, 22 percent are ANG, and the remaining 8 percent are AFRC.

There are three distinct jobs within this cluster that are separated by the type and frequency of the tasks performed.

The Interior Plumber Job is performing in the same Duty groups as the core cluster, however, they begin to specialize in tasks on those located and dealing with indoor plumbing. Distinctive tasks include:

- Cut copper pipe or tubing
- Open clogged or restricted drains using power-operated augers
- Remove or install flushometer valve components
- Open clogged or restricted drains using hand-operated augers
- Inspect plumbing fixtures
- Remove or install flushometers
- Assemble copper tubing using sweat solder
- Remove or install faucets
- Cut plastic pipe or tubing
- Assemble plastic pipe using solvent weld joints

The NCOIC Job accounts for 5 percent of the cluster and demonstrates where the line between managerial and technical tasks begins to change. Members of the NCOIC job spend 19 percent of their time on Duty B, and 14 percent of their time on both training tasks of Duty T and management and supervisory activities of Duty S. In addition they spend 11 percent of their time on Task A (See Table 3). Members of this job are the first-line supervisors of the cluster and are performing those types of tasks. Examples of these tasks include:

- Maintain training records or files
- Counsel trainee on training progress
- Evaluate trainee progress on career development courses (CDCs)
- Evaluate progress of trainees
- Conduct OJT
- Determine training requirements
- Brief personnel concerning training programs or matters
- Determine or establish work assignments or priorities
- Counsel subordinates concerning personal matters

- Maintain hand tools
- Measure pipe
- Maintain shop equipment

The General Plumbing Job accounts for 65 percent of the cluster and is the core job of the career field. The members of this job are still performing the same duties as the rest of the cluster, however, the amount and frequency is increased. They average 323 tasks in this job, second only to the Wastewater Treatment Job (See Table 3). Examples of tasks performed are:

- Measure pipe
- Open clogged or restricted drains using power-operated augers
- Assemble plastic pipe using solvent weld joints
- Cut plastic pipe or tubing
- Locate water mains using base maps
- Assemble or disassemble threaded pipe fittings
- Cut copper pipe or tubing
- Assemble galvanized, black iron, or steel pipe
- Locate and identify underground valves using base utilities maps
- Open clogged or restricted drains using hand-operated augers

III. BAREBASE SYSTEMS INSTALLATION JOB (STG280). The 7 airmen forming this job (less than 1 percent of the survey sample) perform an average of 59 tasks and are distinguished by the fact that they spend 23 percent of their time performing Prime Base Engineer Emergency Force (BEEF) activities of Duty R, 16 percent of their time on Duty A, and 15 percent of their time on Duty B and Duty D (Table 3). Members of this job are called in to set up barebase structures as well as support field operations. The top 10 tasks performed by the members of this job include:

- Remove or install flushometers
- Remove or install flushometers-type water closets
- Set up HB, HE, or HF field latrines
- Remove or install flushometer valve components
- Disassemble HB, HE, or HF field latrines
- Set up water storage bladders
- Set up or tear down tents
- Set up HB, HE, or HF field shower units
- Open clogged or restricted drains using power-operated augers
- Maintain hand tools
- Open clogged or restricted drains using hand-operated augers

Representative task modules for this cluster include:

<u>TM</u>	<u>Module Title</u>	<u>No. of Tasks</u>	<u>Percent Time Spent</u>	<u>Average Percent Members Performing</u>
0001	Pipe and Tubing	24	13	35
0002	Drain Unclogging	7	9	63
0017	Supervisory/Management	29	4	9

The predominant paygrade of this job is E-5 (see Table 4), averaging over 6 years in the career field and over 8 years TAFMS. Sixty-two percent report holding the 5-skill level with 29 percent supervising others. Furthermore, 29 percent of these members are assigned to units overseas.

IV. BAREBASE SYSTEMS MAINTENANCE JOB (STG225). The 13 airmen forming this job (1 percent of the survey sample) are distinguished by the 53 percent of their time spent performing Prime BEEF tasks of Duty R, and 11 percent of their time spent performing general operations or maintenance activities of Duty A (see Table 3). They average performing 65 tasks. The main difference between Barebase Systems Maintenance Job and Barebase Systems Installation Job, is that the members in the installation are called upon to set up the equipment, and the members in Maintenance are tasked with operating and maintaining the systems once they have been erected. Representative tasks performed by these incumbents include:

- Set Up HB, HE, Or HF Field Shower Units
- Set Up Or Tear Down Rowpus
- Set Up Field Water Treatment Systems
- Set Up HB, HE, Or HF Field Latrines
- Disassemble HB, HE, Or HF Field Shower Unites
- Troubleshoot Rowpus
- Construct Field Utility Systems
- Set Up Or Tear Down Tents
- Disassemble HB, HE, Or HF Fields Latrines
- Construct Field Latrines
- Maintain HB, HE, Or HF Field Latrines
- Maintain HB, HE, Or HF Field Shower Units

Representative task modules for this cluster include:

<u>TM</u>	<u>Module Title</u>	<u>No. of Tasks</u>	<u>Percent Time Spent</u>	<u>Average Percent Members Performing</u>
0001	Pipe and Tubing	24	7	26
0003	Valves	14	3	23

The predominant paygrades are E-4 and E-5 and 15 percent report they supervise others. The members of this job average almost 6 years TAFMS. Seventy percent of the members are AD airmen, 15 percent are ANG, and the remaining 15 percent are AFR.

V. FIELD WATER SYSTEMS JOB (STG215). Comprising less than 1 percent of the survey sample, these 12 airmen indicate spending 34 percent of their time performing Prime BEEF activities of Duty R. They also spend 14 percent of their time performing the Installing or Replacing Pipe, Tubing, Fittings, or Appurtenances tasks of Duty B and 10 percent of their time on both Duty C and Duty A tasks (see Table 3). The members of this job perform an average of 165 tasks. These tasks center around installing, removing, or installing water distribution systems in field conditions, whether they be in support of bare base operations, or in support of field training operations. Water systems that they are responsible for can vary between providing potable water to providing water for show and latrine units. In addition to their water distribution tasks, Field Water Systems Job incumbents are also tasked with inspecting, reporting and repairing base damages. Some representative tasks performed by these incumbents are:

- Transport emergency water
- Disinfect water under field condition
- Set up field water treatment systems
- Remove or install HE water distribution systems
- Remove or install HE water distribution system components
- Set up or tear down ROWPUs
- Set up water storage bladders
- Identify and report suspected unexploded ordnance (UXO)
- Lay out bare base site facilities or utilities
- Set up HB, HE, or HF field latrines
- Set up HB, HE, or HF field shower units
- Disassemble HB, HE or HF field shower units

Representative task modules for this cluster include:

<u>TM</u>	<u>Module Title</u>	<u>No. of Tasks</u>	<u>Percent Time Spent</u>	<u>Average Percent Members Performing</u>
0001	Pipe and Tubing	24	8	53
0007	Supervisory/Management	29	6	20
0002	Drain Unclogging	7	3	49
0011	Sprinkler System	7	2	32

Fifty-eight percent of these job incumbents hold the 5-skill level, with the other 42 percent holding the 7-skill level (Table 4). These members average over 8 years in the career field and almost just over 9 years TAFMS. The predominant paygrade is E-6.

VI. WATER TREATMENT TECHNICIAN JOB (STG203). The 5 airmen forming this job (less than one percent of the survey sample) are distinguished by the 8 percent of their time spent performing water sampling, testing and analysis tasks of Duty H. While this may not seem like a large portion of their time, it is greater than all of the jobs in this career ladder and more than doubles every job with the exception of the Pool Maintenance and the Wastewater Treatment Jobs (see Table 3). They average performing 195 tasks, which include:

- Perform turbidity tests of water samples, other than swimming pool samples
- Perform chlorine residual test of water samples
- Test raw water sources
- Disinfect water lines
- Perform pH test of water samples
- Perform Chloride tests of water samples
- Perform coagulation analyses of water samples
- Collect swimming pool water samples
- Set up water storage bladders
- Set up water treatment systems
- Set up HB, HE, or HF field shower units
- Perform chlorine residual test of wastewater samples

Representative task modules for this job include:

<u>TM</u>	<u>Module Title</u>	<u>No. of Tasks</u>	<u>Percent Time Spent</u>	<u>Average Percent Members Performing</u>
0013	Swimming Pool	16	5	56
0007	Sewer Lines	5	1	44
0020	Water Sample Test	11	1	24

Task module analysis shows that the top two task modules deal with those areas that require the greatest amount of water treatment.

The predominant paygrade is E-6, 60 percent report having the 5-skill level and 80 percent reporting they supervise others. Only 20 percent of the members of this job are AD airmen, while ANG and AFRC account for 40 percent respectively.

VII. WASTEWATER TREATMENT JOB (STG141). The 5 incumbents in this job also comprise less than 1 percent of the survey sample and report spending 13 percent of their time performing Operating or Maintaining Wastewater Treatment Systems activities of Duty J. They also spend 15 percent of their time performing the General Operations and Maintenance activities of Duty A (see Table 3). The members of this job perform an average of 331 tasks, the greatest number in the AFS. Some representative tasks performed by these incumbents are:

- Collect and preserve water samples for chemical analyses at other agencies
- Repair sewer jet hoses
- Perform tannin tests of wastewater samples
- Check water sample temperatures
- Lubricate sewer lift pumps
- Clean and drain flame traps
- Perform phosphate tests of wastewater samples
- Perform settleable solids tests of wastewater samples
- Inspect extended aeration activated sludge units
- Perform total nitrogen tests of wastewater samples
- Perform coliform bacteriological tests of water samples
- Inspect water treatment lagoons

Representative task modules for this job include:

<u>TM</u>	<u>Module Title</u>	<u>No. of Tasks</u>	<u>Percent Time Spent</u>	<u>Average Percent Members Performing</u>
0022	Wastewater Sample Test	25	4	50
0021	Wastewater	13	2	46
0020	Water Sample Test	11	2	45
0007	Sewer Lines	5	1	48

Task module analysis validates the data and corroborates the task statements.

Forty percent of these job incumbents hold the 5-skill level, 40 hold the 7-skill level, and the remaining 20 percent hold the 3-skill level (see Table 4). These members average over 10 years in the career field and over 11 years TAFMS. The predominant paygrade is E-4.

VIII. POOL MAINTENANCE JOB (STG148). The 22 airmen forming this job (2 percent of the survey sample) are distinguished by the 18 percent of their time being spent performing Operating or Maintaining Swimming Pool activities of Duty G (see Table 3), the largest amount of time on this duty in the sample survey. In addition they also spend 23 percent of their time performing General Operations or Maintenance activities of Duty A. They average performing 139 tasks. Representative tasks performed by these incumbents include:

- Maintain chlorine level in swimming pools
- Treat swimming pools with chemicals
- Backwash swimming pool filters
- Perform chlorineresidual test of water samples
- Recirculate swimming pools
- Collect swimming pool water samples
- Perform pH test of water samples
- Clean swimming pool hair catchers
- Direct water flow through filters
- Adjust pH in swimming pools
- Super-chlorinate swimming pools
- Clean swimming pool drains

Representative task modules for this job include:

<u>TM</u>	<u>Module Title</u>	<u>No. of Tasks</u>	<u>Percent Time Spent</u>	<u>Average Percent Members Performing</u>
0013	Swimming Pool	16	6	85
0009	Backflow	20	4	16
0003	Valves	14	3	47
0002	Drain Unclogging	7	1	26

Task module analysis shows predominance of tasks dealing with the swimming pool, backflow, and drainage. All of these areas are important aspects of swimming pool operation and maintenance.

The predominant paygrade is E-4 and 27 percent report they supervise others. The members of this job average over 4 years in the career field and over 5 years TAFMS. As expected, all members of this job are AD airmen.

IX. FIRE SUPPRESSION JOB (STG240). The 8 airmen forming this job (less than one percent of the survey sample) perform an average of 158 tasks and are distinguished by the fact that they spend 45 percent of their time performing Installing or Maintaining Fire Suppression Systems tasks of Duty L (see Table 3). The top 10 tasks performed by the members of this job include:

- Inspect dry-pipe fire suppression system
- Clean fire suppression system valve enclosures
- Remove or install sprinkler system components
- Clean inside of components of wet-pipe fire suppression systems

- Inspect dry-pipe pneumatic air compressors
- Identify leaks on dry-pipe fire suppression system
- Identify leaks on wet-pipe fire suppression system
- Inspect wet-pipe fire suppression system components
- Identify and mark fire suppression system piping
- Replace wet-pipe fire suppression system components
- Inspect deluge fire suppression systems
- Perform residual pressure tests on valves of wet-pipe fire suppression systems

Representative task modules for this job include:

<u>TM</u>	<u>Module Title</u>	<u>No. of Tasks</u>	<u>Percent Time Spent</u>	<u>Average Percent Members Performing</u>
0014	Fire Suppression System	77	43	79
0003	Valves	14	6	61
0001	Pipe and Tubing	24	5	40
010	Pressure Regulators	8	2	34

Task module analysis shows that tasks dealing with Fire Suppression Systems take up the majority of their time. In addition, pressure regulators are often utilized as part of the Fire Suppression Systems.

The predominant paygrade of this job is E-5 (see Table 4), averaging over 9 years in the career field and almost 14 years TAFMS. Eighty-eight percent of the job incumbents report holding the 5-skill level with 62 percent indicating they supervise others. Furthermore, all members are AD airmen.

X. TEAM LEADER JOB (STG162). The 6 airmen forming this job (also less than one percent of the survey sample) are distinguished by the 25 percent of their time spent performing Management and Supervisory tasks of Duty S, and 13 percent of their time spent performing General Supply and Equipment tasks of Duty V (see Table 3). They average performing 171 tasks. Unlike the NCOIC job incumbents, members of the Team Leader Job are not spending as much time working the technical aspects of the career field. Team Leader Job incumbents perform several supply and scheduling tasks, and often work with the Work Information Management System (WIMS) to accomplish these tasks. In addition, Team Leader Job members often act as liaisons between different Civil Engineering (CE) shops on the base. Representative tasks performed by these incumbents include:

- Prepare bill of materials request
- Retrieve work order data using WIMS
- Input nouns to WIMS dictionary for CE material acquisition system (CEMAS)

- Coordinate work activities with other CE shops
- Order parts using WIMS
- Determine or establish logistics requirements, such as personnel, equipment, tools, parts, supplies, or workspace
- Determine or establish work assignments or priorities
- Draft work orders for CE support
- Cancel or close out work information management system (WIMS) work orders
- Pick up, deliver, or store equipment, tools, parts, or supplies, other than respirators
- Input data for work orders using WIMS
- Assemble plastic pipe using solvent weld joints

Representative task modules for this cluster include:

<u>TM</u>	<u>Module Title</u>	<u>No. of Tasks</u>	<u>Percent Time Spent</u>	<u>Average Percent Members Performing</u>
0017	Supervisory and Management	29	12	38
0001	Pipe and Tubing	24	11	72
0018	WIMS	7	4	31

Task module analysis shows that Team Leader Job incumbents are performing Supervisory and Management task, as well as using WIMS to accomplish their duties.

The predominant paygrades are E-5 and E-6 and 67 percent report they supervise others. The members of this job average almost 10 years TAFMS. All members of this job are AD airmen.

XI. OJT TRAINERS JOB (STG155). Comprising less than 1 percent of the survey sample, these 6 airmen indicate spending 41 percent of their time performing Training Activities of Duty T. They also spend 36 percent of their time performing the tasks of Duty S (see Table 3). The members of this job perform an average of 35 tasks, the least amount of all of the jobs in the career field. Some representative tasks performed by these incumbents are:

- Maintain training records or files
- Evaluate trainee progress on CDCs
- Brief personnel concerning training programs or matters
- Counsel trainees on training progress
- Evaluate progress or training
- Determine training requirements
- Conduct supervisory performance feedback sessions
- Establish or maintain study reference files
- Conduct supervisory orientations for newly assigned personnel

- Administer or score tests
- Determine or establish work assignments or priorities
- Conduct general meetings, such as staff meetings, briefings, conferences, or workshops

Representative task modules for this job include:

<u>TM</u>	<u>Module Title</u>	<u>No. of Tasks</u>	<u>Percent Time Spent</u>	<u>Average Percent Members Performing</u>
0017	Supervisory / Management	29	52	52
0019	Training	4	2	17

Task module analysis shows that these members are spending over half of their time performing Supervisory and Management tasks as well as picking up some training tasks.

Sixty-seven percent of these job incumbents hold the 7-skill level, with the other 33 percent holding the 5-skill level (Table 4). These members average over 9 years TAFMS. The predominant paygrade is E-7, and 17 percent are AD airmen, 50 percent are ANG, and the remaining 33 percent are AFRES.

XII. MANAGEMENT AND SUPERVISORY JOB (STG208). The 78 airmen forming this job (6 percent of the survey sample) are distinguished by the 47 percent of their time spent performing Duty S, which is more than any other job in the career ladder (see Table 3). Members in this job perform more administrative tasks than technical tasks, and are often Superintendents or Functional Managers of the career field. They average performing 130 tasks which include:

- Determine or establish work assignments or priorities
- Determine or establish logistics requirements, such as personnel, equipment, tools, parts, supplies or workspace
- Write or indorse military performance reports
- Coordinate work requirements with CE superintendents
- Write recommendations for awards or decorations
- Conduct supervisory performance feedback sessions
- Coordinate work activities with other CE shops
- Counsel subordinates concerning personal matters
- Conduct general meetings, such as staff meetings, briefings, conferences, or workshops
- Evaluate work schedules or work load requirements
- Brief personnel concerning training programs or matters
- Implement safety or security programs.

Representative task modules for this job include:

<u>TM</u>	<u>Module Title</u>	<u>No. of Tasks</u>	<u>Percent Time Spent</u>	<u>Average Percent Members Performing</u>
0017	Supervisory / Management	29	52	52
0019	Training	4	2	17
0018	WIMS	7	2	7

Task module analysis shows that the majority of their time is spent performing the Supervisory and Management tasks.

The predominant paygrade is E-7, 77 percent report having the 7-skill level and 86 percent reporting they supervise others. The members of this job average over 15 years in the career field. Eighty-five percent of the members of this job are AD airmen, while ANG and AFRC account for 9 and 6 percent respectively.

Comparison to Previous Study

The AFSC 3E4X1 career ladder structure has undergone a few changes since the last study was performed in 1995 (See Table 5). While most of the jobs that were found in the previous OSR were also still in existence in the current study, the distribution of personnel in the different jobs has changed for the career field. One trend that may increase as the Air Force begins to move closer to the AEF, is the increase of barebase and field tasks, duties, and jobs. In neither study was there significant mention of pest control tasks duties or jobs, however this is still a tasking within this Air Force Specialty.

ANALYSIS OF DAFSC GROUPS

An analysis of DAFSC groups, in conjunction with the analysis of the career ladder structure, is an important part of each occupational survey. The DAFSC analysis identifies differences in tasks performed at the various skill levels. This information may then be used to evaluate how well career ladder documents, such as the AFMAN 36-2108 *Airman Classification, Specialty Description*, and the Career Field Education and Training Plan (CFETP), reflect what career ladder personnel are actually doing in the field.

AD

The distribution of skill-level groups across the career ladder jobs and clusters is displayed in Table 6, while Table 7 offers another perspective by displaying the relative percent time spent on each duty across skill-level groups. A somewhat typical pattern of progression is noted within the AFSC 3E4X1 career ladder. Personnel at the 3- and 5-skill levels work in the technical jobs of the career ladder and spend most of their time on technical tasks. As incumbents progress to the 7-skill level they begin to perform supervisory tasks, but still spend some of their time performing the technical tasks of the career ladder.

Skill-Level Descriptions

DAFSC 3E431. Representing 25 percent of the survey sample, these 329 airmen perform an average of 197 tasks, the fewest of any DAFSC group, and primarily perform in the General Plumber Job which falls within the General Plumber Cluster (see Table 6). Table 7 reflects the percent time spent on duties by DAFSC 3E4X1 personnel. At the 3-skill level, their time is well-distributed among the technical tasks of the career ladder. Representative tasks performed by these members are listed in Table 8.

DAFSC 3E451. The 439 members of this group account for 33 percent of the survey sample and perform an average of 245 tasks. Seventy-three percent of this 5-skill level members (321 personnel) work in the General Plumber Cluster, and 258 members work in the General Plumber Job within the Cluster. (See Table 6). Table 7 provides a comparison of the relative time spent on duties at the 5-skill level. This table reflects a pattern similar to the 3-skill level, with fairly even distribution of members performing the technical tasks of the career ladder. As shown in this table, 5-skill level personnel begin to perform the supervisory tasks of Duty S.

Table 9 lists representative tasks performed by DAFSC 3E451 personnel. Table 10 reflects those tasks which best differentiate the 3-skill level members from the 5-skill level members. This table shows that there are no tasks, which differentiate the 3-skill level members from the 5-skill level members. Conversely, the 5-skill level members are performing Management and Supervisory as well as Training Activities, which differentiate them from the 3-skill level

members. This addition of tasks helps accounts for the 48 additional tasks performed by the 5-skill level members.

DAFSC 3E471. These 116 members perform an average of 210 tasks and represent 9 percent of the survey sample. Although they are not spending as much time on the technical duties as either the 3-skill or 5-skill level members, they are still performing a substantial number of tasks. This is due to the addition of the managerial, administration, training and supply tasks that are added as a result of their roles of supervisors and managers of the career field. Table 6 shows the majority of the 7-skill level members, 48 personnel, are in the Management and Supervisory Job (41 percent).

Table 7 reflects the percent time spent on duties by DAFSC 3E471 members. This table clearly shows the decrease in the amount of time spent by members performing the technical tasks of Duty A through Duty R, compared to the 3- and 5-skill level members, while showing the increase in time spent performing management and supervisory tasks.

Representative tasks performed by 7-skill level members are reflected in Table 11. Table 12 reflects tasks which best differentiate between 5- and 7-skill levels. This table clearly shows the much higher devotion to management and supervisory tasks at the 7-skill level than the 5-skill level.

ANG

Table 13 shows the distribution of skill-level groups across the career ladder jobs and clusters for ANG personnel. Table 14 offers another perspective by displaying the relative percent time spent on each duty across skill-level groups. As can be seen in Table 13, only one ANG member is in performing in the 3-skill level. Consequently, ANG DAFSC 3E451 and 3E471 personnel will be the only groups reported on. In addition, ANG personnel only group into one cluster and 7 jobs as compared to the 1 cluster and 11 jobs for their AD counterparts.

Skill-Level Descriptions

DAFSC 3E451. The 168 members of this group account for 13 percent of the survey sample and perform an average of 149 tasks. Sixty-one percent of this 5-skill level members (103 personnel) work in the General Plumber Cluster. 53 of those 103 members work in the Interior Plumber Job and 48 members work in the General Plumber Job within the Cluster. (See Table 13). Table 14 provides a comparison of the relative time spent on duties at the 5-skill level. This table shows an even distribution between the first four duties and an increase in Prime BEEF activities of Duty R. Unlike their AD counterparts, Supervisory duties are not significant at this skill level. Table 15 reflects representative tasks performed by ANG DAFSC 3E451 personnel.

DAFSC 3E471. These 124 members perform an average of 205 tasks and represent 9 percent of the survey sample. ANG 7-skill level personnel almost mirror the 5-skill level personnel with the addition of some supervisory/management and training duties which helps account for the additional tasks performed by this DAFSC group. Table 14 shows similarity in the amount of

time spent by members performing the technical tasks of Duty A through Duty R between the 5- and 7-skill level members, while showing the increase in time spent performing the Management and Supervisory tasks of Duty S, and the Training Activities of Duty T.

Representative tasks performed by ANG 7-skill level members are reflected in Table 16. Table 17 reflects tasks which best differentiate between 5- and 7-skill levels. This table shows, like the AD 3- and 5-skill level members, that there are no tasks which differentiate the 5-skill level members from the 7-skill level members. However, as displayed in Table 17, the 7-skill level members perform several Training and Management/Supervisory tasks that differentiate them from the 5-skill level members.

AFRC

Table 18 shows the distribution of skill-level groups across the career ladder jobs and clusters for AFRC personnel. Table 19 displays the relative percent time spent on each duty across skill-level groups. As can be seen in Table 18, only two AFRC members are performing in the 3-skill level. Consequently, AFRC DAFSC 3E451 and 3E471 personnel will be the only groups reported on. In addition, AFRC personnel only group into 1 cluster and 6 jobs as compared to the 1 cluster and 11 jobs for their AD counterparts and 1 cluster and 7 jobs for their ANG counterparts.

Skill-Level Descriptions

DAFSC 3E451. The 90 members of this group account for 7 percent of the survey sample and perform an average of 126 tasks. Fifty-two percent of AFRC 5-skill level personnel (47 members) did not group cleanly into any cluster or job. Thirty-six percent of this 5-skill level members (32 personnel) work in the General Plumber Cluster. Within the cluster, the personnel are pretty evenly distributed between the General Plumber and Interior Plumbing Job, with 17 and 13 members respectively (See Table 18). Table 19 provides a comparison of the relative time spent on duties at the 5-skill level. This table shows that the greatest percent of their time is dealing in Prime BEEF activities of Duty R. Similar to their ANG counterparts, Supervisory duties are not significant at this skill level. Table 20 reflects representative tasks performed by AFRC DAFSC 3E451 personnel.

DAFSC 3E471. These 56 members perform an average of 210 tasks and represent 4 percent of the survey sample. AFRC 7-skill level personnel perform basically the same duties as the AFRC 5-skill level personnel with the addition of some supervisory/management and training duties which helps account for the tremendous increase in tasks performing. (see Table 19).

Table 19 reflects the percent time spent on duties by AFRC DAFSC 3E471 members. This table similarity in the amount of time spent by members performing the technical tasks of Duty A through Duty Q between the 5- and 7-skill level members. However, 7-skill level members are spending more of their time engaged in training, supervisory/management and less time working with Prime BEEF duties.

Representative tasks performed by AFRC 7-skill level members are reflected in Table 21. Table 22 reflects tasks which best differentiate between 5- and 7-skill levels. This table shows, like the AD 3- and 5-skill level members, and their ANG counterparts, that there are no tasks which differentiate the 5-skill level members from the 7-skill level members. However, the 7-skill level members are performing several Training and Management/Supervisory tasks which differentiate them from the 5-skill level members.

Table 23 shows those duties which best differentiate between all members of ANG and AFRC. While the differences are not extreme, members ANG members are spending more time removing and installing domestic components, while AFRC personnel are spending more time engaged in Prime BEEF activities.

Summary

Progression in the Utilities Systems career ladder follows a typical pattern with a highly technical job focus at the lower skill levels, and with a broadening into supervision and management at the 7-skill level. Both 3- and 5-skill level personnel have technically-oriented jobs that include many of the core tasks of the career field, with broadening into supervisory functions at the 7-skill level.

TRAINING ANALYSIS

Occupational survey data are one of many sources of information which can be used to assist in the development of a training program relevant to the needs of personnel in their first enlistment. Factors which may be used in evaluating training include the overall description of the work being performed by first-job or first-enlistment personnel and their overall distribution across career ladder jobs, percentages of first-job (1-24 months TAFMS) or first-enlistment (1-48 months TAFMS) members performing specific tasks, as well as TE and TD ratings (previously explained in the SURVEY METHODOLOGY SECTION).

AFSC 3E4X1 FIRST-ENLISTMENT PERSONNEL CAREER LADDER JOBS

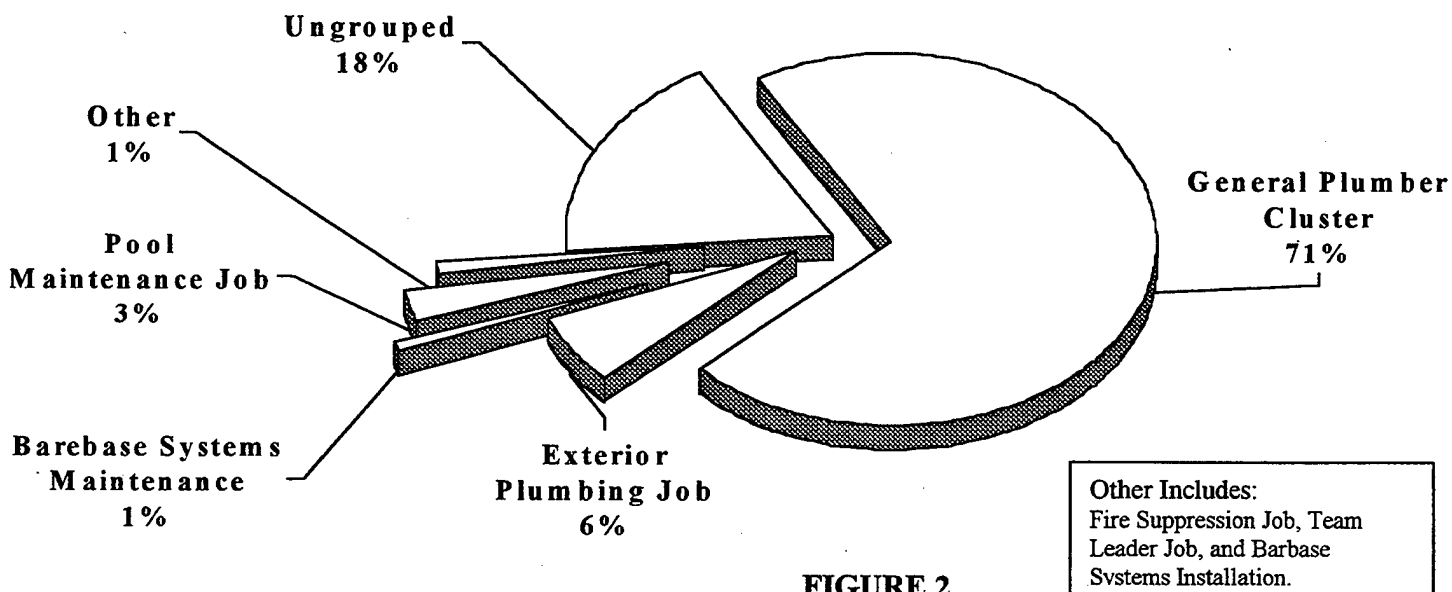


FIGURE 2

First-Enlistment Personnel

There are 352 survey respondents in their first-enlistment, representing 27 percent of the total survey sample. Figure 2 reflects the distribution of first-enlistment personnel within the career ladder. Table 24 displays the relative percent of time spent on duties by first-enlistment personnel. Reviewing the table, first-enlistment personnel spend a combined 65 percent of their time performing tasks in Duties A through D (22, 20, 9 and 14 percent respectively). First-enlistment personnel are primarily employed in the General Plumber Cluster, with representative tasks performed displayed in Table 25.

Table 26 represents a list of equipment items used by more than 20 percent of first-enlistment AFSC 3E4X1 personnel.

Training Emphasis (TE) and Task Difficulty (TD) Data

TE and TD data are secondary task factors that can assist technical school personnel in deciding which tasks should be emphasized in entry-level training. These ratings, based on the judgments of senior career ladder NCOs working at operational units in the field, are collected to provide training personnel with a rank-ordering of those tasks considered important for airmen with 1-48 months TAFMS training (TE), and a measure of the relative difficulty of the JT tasks. When combined with data on the percentages of first-enlistment personnel performing tasks, comparisons can then be made to determine if training adjustments are necessary. For example, tasks receiving high ratings on both task factors (TE and TD), accompanied by moderate to high percentages performing, may warrant resident training. Those tasks receiving high task factor ratings, but low percentages performing, may be more appropriately planned for OJT programs within the career ladder. Low task factor ratings may highlight tasks best omitted from training for first-enlistment personnel, but this decision must be weighed against percentages of personnel performing the tasks, command concerns, and criticality of the tasks.

To assist training development personnel, AFOMS developed a computer program that uses these task factors and the percentage of first-enlistment personnel performing tasks to produce Automated Training Indicators (ATI). ATIs correspond to training decisions listed and defined in the Training Decision Logic Table found in Attachment 1, AETCI 36-2601. ATIs allow training developers to quickly focus attention on those tasks which are most likely to qualify for resident course consideration.

Tasks having the highest TE ratings for AFSC 3E4X1 first-enlistment personnel are listed in Table 27. The percentage of 1-24 months, first-job personnel, is also included in the table. As illustrated in Table 27, tasks with the highest TE ratings deal with unclogging drains using a power-operated augers, locating water mains using base maps, and removing or installing urinals. In addition the Reverse Osmosis Water Purification Units (ROWPUs) and their components are mentioned four times within this list. These tasks are performed by high percentages of first-enlistment personnel, and most have high to average TD ratings. While there are several tasks that received a high TD rating, too few first-job and first-enlistment members are performing these tasks to warrant inclusion in the 3-skill level course (see Table 28).

Various lists of tasks, accompanied by TE and TD ratings, are contained in the TRAINING EXTRACT package and should be reviewed in detail by training school personnel. (For a more detailed explanation of TE and TD ratings, see Task Factor Administration in the SURVEY METHODOLOGY section of this report.)

Specialty Training Standard (STS)

A comprehensive review of STS 3E4X1, dated 1 April 1997, compared STS items to survey data (assistance from subject-matter experts of the 366 TRS/TRR Technical Training School,

Sheppard AFB, TX, was utilized in matching JI tasks to STS elements). STS elements containing general knowledge information, mandatory entries, subject-matter-knowledge-only requirements, or basic supervisory responsibilities were not examined. Task knowledge and performance elements of the STS were compared against the standard set forth in AETCI 36-2601 and AFI 36-2623 (i.e., include tasks performed or knowledge required by 20 percent or more of the personnel in a skill level [criterion group] of the specialty).

Out of the 104 proficiency coded items for the 3-skill level technical course, 100 items were well supported. Table 29 shows the four items that were not supported by the data. Two of the items deal with electric motors and two deal with water sample testing. These items should be reviewed by training personnel to decide if inclusion in the STS is warranted. Tasks not referenced to any element of the STS are listed at the end of the STS computer listing of the Training Extract. These tasks were reviewed to determine if there were any tasks concentrated around any particular function or job. Many of the unreferenced tasks are managerial or supervisory in nature and not normally matched to an STS. Those tasks that could be included in the course deal mostly with repair and maintenance of valves, as well the installation and removal of domestic lavatories and their components and also should be reviewed by training personnel to determine if STS inclusion is necessary. A sample of technical tasks, performed by 20 percent or more criterion group members, not referenced to the STS, is listed in Table 30.

Plan of Instruction (POI) Analysis

Technical school SMEs matched JI tasks to POI 3ABY3E431-001, dated 8 August 1998, training objectives. Objectives were evaluated in a method similar to the STS analysis, as percent members performing data for first-job (1-24 months TAFMS) and first-enlistment (1-48 months TAFMS) personnel, TE, TD, and ATI ratings were examined.

POI blocks, units of instruction, and criterion objectives were compared against guidance provided by AETCR 52-22 (30 percent or more criterion first-enlistment group performing trained tasks). In accordance with this guidance, tasks trained in the course not meeting these criteria should be considered for elimination from formal course training if not justified on some other acceptable basis.

POI analysis reveals out of the 43 objectives that were matched, 41 were well supported by percent members performing data. Table 31 shows both items along with their percent members performing data. Many technical tasks, performed by over 30 percent of first-enlistment personnel, were not matched to the POI. Examples are listed in Table 32. Many of these tasks are repetitions of those tasks not matched to the STS. Training personnel should review these and other unreferenced tasks as well as the two unsupported items (prepare a bill of materials and inspect manhole) to determine if these areas should be incorporated into or deleted from the formal course.

JOB SATISFACTION ANALYSIS

An examination of the job satisfaction indicators of various groups can give career ladder managers a better understanding of some of the factors which may affect the job performance of airmen in the career ladder. Attitude questions covering job interest, perceived utilization of talents and training, sense of accomplishment from work, and reenlistment intentions were included in the survey booklet to provide indications of job satisfaction.

With this in mind, job satisfaction responses for AFSC 3E4X1 personnel were analyzed and provided the following comparisons: (1) among TAFMS groups of the AFSC 3E4X1 career ladder and a comparative sample of Support career ladder personnel surveyed in 1998 and (2) between current and previous AFSC 3E4X1 respondents, and (3) by looking across specialty groups identified in the SPECIALTY JOBS section of the report.

Table 33 presents job satisfaction data for AFSC 3E4X1 TAFMS groups, together with TAFMS data for a comparative sample of Support career ladders surveyed in 1998. First-enlistment personnel rated all categories slightly lower than their Support career ladder counterparts. Second-enlistment personnel are not as satisfied as their counterparts even though they are fairly satisfied overall. Career airmen (those over 8 years TAFMS), rated all areas essentially the same as the comparative sample--especially reenlistment intentions. All TAFMS show a trend that they do not feel that they are not able to utilize the training that they were given to the maximum extent.

An indication of changes in job satisfaction perceptions within the career ladder is in Table 34, which represents TAFMS group data for 1999 survey respondents and data from respondents to the last OSR of the career ladder in 1995. Generally, perceptions of job satisfaction have increased across the board in the area of perceived utilization of training. So while, it is still lower than other Support career ladders, the trend seems to be an increasing one in the 3E4X1 AFS. In addition, current career personnel rated almost every area higher than their 1995 counterparts. However, in first and second-enlistment personnel, reenlistment intentions have decreased.

Tables 35 through 37 present job satisfaction ratings for AD, ANG, and AFRC incumbents, with the major cluster and specialty identified in career ladder structure for AFSC 3E4X1. An examination of these data may reveal indications of concern to functional managers. AD personnel expressing the least amount of satisfaction were found in the Barebase Systems Installation Job, Barebase Systems Maintenance Job, Exterior Plumbing Job, and the Wastewater Treatment Job. In all jobs with over 1 person responding to answers, there is not one job with over a 68 percent reenlistment rate. ANG personnel in all jobs with the exception of the two Barebase jobs, indicate average to high job satisfaction. Likewise, their AFRC counterparts indicate average to high job satisfaction. Reenlistment intentions for both ANG and AFRC personnel are higher than AD members.

IMPLICATIONS

As explained in the INTRODUCTION, this survey was initiated to provide current job and task data for use in evaluating the AFMAN 36-2108 *Specialty Description* and appropriate training documents. Survey results clearly indicate that the present classification structure, as described in the latest specialty description, accurately portrays the jobs performed in this career ladder.

Specialty Job Analysis indicates no big changes have occurred in AFSC 3E4X1 over the past 4 years with the exception of some added field and barebase taskings. AD, ANG, and AFRC skill-level analysis revealed the career ladder progression is typical, with the move from technical work at the 3- and 5-skill levels to supervisory and management tasks at the 7-skill level.

No serious job satisfaction problems appear to exist within the AFSC 3E4X1 career ladder. For the most part, respondents appear satisfied with their jobs. This holds true for AD, ANG, and AFRC members. The only exception is the perception that members are unable to fully utilize their training and talents.

Based on survey data, the career ladder training documents are accurately supported by percent members performing data as well as task factor ratings. Training personnel will want to look at the four unsupported STS items and the two unsupported POI objectives as well as the extensive task not referenced list to see if any of the unreferenced tasks warrant inclusion into the formal course training.

APPENDIX A
TABLES 1 THROUGH 23

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TABLE 1

MAJCOM REPRESENTATION OF AFSC 3E4X1 SAMPLE

<u>MAJOR COMMAND</u>	<u>PERCENT OF ASSIGNED**</u>	<u>PERCENT OF SAMPLE</u>
ACC	17	17
AETC	7	7
AFMC	12	12
AFSOC	1	1
AFSPC	5	5
AMC	7	7
PACAF	9	9
USAFA	1	1
USAFE	7	7
AFRES UNIT	11	11
ANG UNIT	22	22
OTHER	1	1

*Less than 1 percent

- Other includes 11 Wg, AFCES, AFDW, AIA, and ELM

	<u>AFSC 3E4X1</u>
TOTAL ASSIGNED**	2908
TOTAL ELIGIBLE	2635
TOTAL IN SAMPLE	1325
PERCENT OF ASSIGNED IN SAMPLE	46%
PERCENT OF ELIGIBLE IN SAMPLE	50%

** Assigned strength as of October 1998

- Excludes personnel in PCS, student, or hospital status, or less than 6 weeks on the job

TABLE 2

PAYGRADE DISTRIBUTION OF SURVEY SAMPLE FOR AFSC 3E4X1

ACTIVE DUTY				AIR NATIONAL GUARD				AIR FORCE RESERVE COMMAND			
PAYGRADE	PERCENT ASSIGNED*	PERCENT SAMPLE		PAYGRADE	PERCENT ASSIGNED*	PERCENT SAMPLE		PAYGRADE	PERCENT ASSIGNED*	PERCENT SAMPLE	
E-1 to E-3	29	31		E-1 to E-3	3	4		E-1 to E-3	-	-	
E-4	27	27		E-4	22	20		E-4	14	10	
E-5	25	26		E-5	34	34		E-5	31	28	
E-6	11	10		E-6	24	24		E-6	31	35	
E-7	7	6		E-7	16	17		E-7	24	27	
E-8	1	0		E-8	1	1		E-8	-	-	

* Assigned strength as of October 1998

TABLE 3

RELATIVE PERCENT TIME SPENT ON DUTIES BY SPECIALTY JOBS

DUTIES	EXTERIOR	GENERAL	BAREBASE	BAREBASE	FIELD	WATER
	PLUMBING	PLUMBER	SYSTEMS	SYSTEMS	WATER	TREAT
	JOB	CLUSTER	INSTALL	MAINT	JOB	TECH
	STG 237	STG 168	STG 280	STG 225	STG 215	STG 203
A Performing General Operations Or Maintenance Activities	17	17	16	11	10	10
B Installing Or Replacing Pipe, Tubing, Fittings, Or Appurtenances	30	20	15	9	14	10
C Installing Or Maintaining Plumbing Fixtures And Equipment	2	10	14	1	10	7
D Maintaining Valves	15	13	15	8	8	6
E Maintaining Water Distribution Systems	11	5	1	1	3	3
F Operating Or Maintaining Installation Water Treatment	1	1	*	1	*	4
G Operating Or Maintaining Swimming Pools	1	2	0	0	2	6
H Performing Water Sampling, Testing, And Analyses	2	1	3	1	2	8
I Maintaining Sanitary Waste And Sewer Systems	5	2	1	*	*	5
J Operating Or Maintaining Wastewater Treatment Systems	*	1	0	*	*	7
K Performing Wastewater Sampling, Testing, And Analysis	*	*	*	0	*	3
L Installing Or Maintaining Fire Suppression Systems	*	3	2	*	*	*
M Maintaining Gas Distribution Systems	4	1	*	*	*	*
N Maintaining Pneumatic Systems	*	*	*	0	*	*
O Operating Or Maintaining Specialized Or Field Water Treatment Equipment	0	*	0	*	0	0
P Performing Environmental Or Safety Activities	3	2	2	2	3	2
Q Performing Pest Management Activities	*	*	0	*	*	*
R Performing Prime Base Engineer Emergency Force (Beef) Activities	2	6	23	53	34	17
S Performing Management And Supervisory Activities	3	6	2	1	4	4
T Performing Training Activities	*	3	3	4	5	3
U Performing General Administrative And Technical Order (To) System Activities	*	1	0	1	*	1
V Performing General Supply And Equipment Activities	2	3	*	6	2	3
* Indicates less than 1 percent						

* Indicates less than 1 percent

TABLE 3 (CONTINUED)

RELATIVE PERCENT TIME SPENT ON DUTIES BY SPECIALTY JOBS

DUTIES	WASTE WATER TREAT JOB STG 141	POOL MAINTENANCE JOB STG 148	FIRE SUPPRESSION JOB STG 240	TEAM LEADER JOB STG 162	OJT TRAINER JOB STG 155	MGT & SUPERVISORY JOB STG 208
A Performing General Operations Or Maintenance Activities	15	23	9	8	*	3
B Installing Or Replacing Pipe, Tubing, Fittings, Or Appurtenances	7	9	10	16	*	2
C Installing Or Maintaining Plumbing Fixtures And Equipment	5	2	*	8	*	1
D Maintaining Valves	8	8	13	7	*	1
E Maintaining Water Distribution Systems	3	4	2	2	*	1
F Operating Or Maintaining Installation Water Treatment	4	7	*	*	0	*
G Operating Or Maintaining Swimming Pools	3	18	0	*	0	*
H Performing Water Sampling, Testing, And Analyses	5	7	0	*	0	*
I Maintaining Sanitary Waste And Sewer Systems	3	2	*	*	0	*
J Operating Or Maintaining Wastewater Treatment Systems	13	3	0	0	0	*
K Performing Wastewater Sampling, Testing, And Analysis	6	*	0	0	0	*
L Installing Or Maintaining Fire Suppression Systems	7	*	45	2	0	*
M Maintaining Gas Distribution Systems	2	*	0	*	0	*
N Maintaining Pneumatic Systems	*	*	2	*	0	*
O Operating Or Maintaining Specialized Or Field Water Treatment Equipment	*	*	0	0	0	*
P Performing Environmental Or Safety Activities	2	3	*	*	1	2
Q Performing Pest Management Activities	*	0	*	*	0	*
R Performing Prime Base Engineer Emergency Force (BEEF) Activities	6	2	2	7	12	8
S Performing Management And Supervisory Activities	6	5	4	25	36	47
T Performing Training Activities	1	1	5	2	41	12
U Performing General Administrative And Technical Order (TO) System Activities	2	*	2	8	3	9
V Performing General Supply And Equipment Activities	1	3	5	13	3	10

* Indicates less than one percent

TABLE 4

SELECTED BACKGROUND DATA FOR SPECIALTY JOBS

	EXTERIOR PLUMBING JOB STG 237	GENERAL PLUMBER CLUSTER STG 168	BAREBASE SYSTEMS INSTALLATION JOB STG 280	BAREBASE SYSTEMS MAINT JOB STG 225	FIELD WATER SYSTEMS JOB STG 215	WATER TREATMENT TECHNICIAN JOB STG 203
NUMBER IN GROUP	30	861	7	13	12	5
PERCENT OF SAMPLE	2%	67%	.5%	1%	.9%	.5%
PERCENT IN CONUS	68%	81%	71%	77%	100%	60%
SKILL-LEVEL DISTRIBUTION:						
4MO31	57%	28%	29%	38%	0%	0%
4MO51	43%	53%	43%	62%	58%	60%
4MO71	0%	19%	29%	0%	42%	40%
4MO91	0%	0%	0%	0%	0%	0%
PREDOMINANT GRADE(S)						
AVERAGE MONTHS IN CAREER FIELD	E-3/E-4 35	E-5/E-4 88	E-5 76	E-4/E-5 73	E-6 101	E-6 112
AVERAGE TAFMS	45	91	99	69	110	53
PERCENT WITH 1-48 MOS IN CAREER FIELD	67%	38%	33%	39%	16%	0%
PERCENT SUPERVISING						
AVERAGE NUMBER OF TASKS PERFORMED	13%	46%	29%	15%	33%	80%
	119	266	59	65	165	195

TABLE 4 (CONTINUED)

SELECTED BACKGROUND DATA FOR SPECIALTY JOBS

	WASTE WATER TREATMENT JOB STG 141	POOL MAINT JOB STG 148	FIRE SUPPRESS JOB STG 240	TEAM LEADER JOB STG 162	MANAGEMENT & SUPERVISORY JOB STG 208	OJT TRAINERS JOB STG 155
NUMBER IN GROUP	5	22	8	6	78	6
PERCENT OF SAMPLE	.5%	2%	.6%	.5%	6%	.5%
PERCENT IN CONUS	60%	55%	63%	67%	53%	83%
SKILL-LEVEL DISTRIBUTION:						
4MO31	20%	45%	0%	16%	0%	0%
4MO51	40%	55%	88%	67%	23%	33%
4MO71	40%	0%	12%	17%	77%	67%
4MO91	0%	0%	0%	0%	0%	0%
A6						
PREDOMINANT GRADE(S)	E-4	E-4	E-5	E-5/E-6	E-7	E-7
AVERAGE MONTHS IN CAREER FIELD	123	54	111	107	169	204
AVERAGE TAFMS	136	65	166	118	186	112
PERCENT WITH 1-48 MOS IN CAREER FIELD	0%	56%	13%	17%	1%	34%
PERCENT SUPERVISING	60%	27%	62%	67%	86%	100%
AVERAGE NUMBER OF TASKS PERFORMED	331	139	158	171	130	35

TABLE 5

SPECIALTY JOB COMPARISONS BETWEEN CURRENT AND 1995 SURVEYS

<u>CURRENT SURVEY (N=1325)</u>	<u>PERCENT OF SAMPLE</u>	<u>1995 SURVEY (N=1192)</u>	<u>PERCENT OF SAMPLE</u>
EXTERIOR PLUMBER JOB	2	NOT IDENTIFIED	-
GENERAL PLUMBER CLUSTER	65	PLUMBING CLUSTER	54
BAREBASE SYSTEMS INSTALLATION JOB	*	NOT IDENTIFIED	-
BAREBASE SYSTEMS MAINTENANCE JOB	1	NOT IDENTIFIED	-
FIELD WATER SYSTEMS JOB	1	FIELD WATER PURIFICATION PLANT OPERATIONS	1
WATER TREATMENT TECHNICIAN JOB	*	WATER SYSTEMS OPERATIONS	*
WASTEWATER TREATMENT JOB	*	WASTE WATER SYSTEMS OPERATIONS	6
POOL MAINTENANCE JOB	2	SWIMMING POOL MAINTENANCE CLUSTER	6
FIRE SUPPRESSION JOB	*	FIRE SUPPRESSION	1
TEAM LEADER JOB	*	NOT IDENTIFIED	-
OJT TRAINERS JOB	*	TRAINING	*
MANAGEMENT AND SUPERVISORY JOB	6	SUPERVISION	10
NOT IDENTIFIED	-	HAZARDOUS WASTE	*
NOT GROUPED	20	NOT GROUPED	21

Indicates less than one percent

TABLE 6
DISTRIBUTION OF AD SKILL-LEVEL MEMBERS
ACROSS CAREER LADDER JOBS

<u>JOB</u>	<u>DAFSC 3E431 (N=329)</u>	<u>DAFSC 3E451 (N=439)</u>	<u>DAFSC 3E471 (N=116)</u>
EXTERIOR PLUMBING JOB	17	13	-
GENERAL PLUMBER CLUSTER	237	321	42
BAREBASE SYSTEMS INSTALLATION JOB	2	1	-
BAREBASE SYTEMS MAINTENANCE JOB	5	4	-
FIELD WATER SYSTEMS JOB	-	1	-
WATER TREATMENT TECHNICIAN JOB	-	1	-
WASTEWATER TREATMENT JOB	1	1	2
POOL MAINTENANCE JOB	10	12	-
FIRE SUPPRESSION JOB	-	7	1
TEAM LEADER JOB	1	4	1
OJT TRAINERS JOB	-	1	-
MANAGEMENT AND SUPERVISORY JOB	-	18	48
NOT GROUPED	56	55	22

TABLE 7

TIME SPENT ON DUTIES BY AD MEMBERS OF SKILL-LEVEL GROUPS
(RELATIVE PERCENT OF JOB TIME)

<u>JOB</u>	<u>DAFSC 3E431 (N=329)</u>	<u>DAFSC 3E451 (N=439)</u>	<u>DAFSC 3E471 (N=116)</u>
A PERFORMING GENERAL OPERATIONS OR MAINTENANCE ACTIVITIES	22	17	9
B INSTALLING OR REPLACING PIPE, TUBING, FITTINGS, OR APPURTENANCES	20	16	6
C INSTALLING OR MAINTAINING PLUMBING FIXTURES AND EQUIPMENT	9	7	3
D MAINTAINING VALVES	15	11	5
E MAINTAINING WATER DISTRIBUTION SYSTEMS	6	5	3
F OPERATING OR MAINTAINING INSTALLATION WATER TREATMENT	1	1	1
G OPERATING OR MAINTAINING SWIMMING POOLS	3	2	1
H PERFORMING WATER SAMPLING, TESTING, AND ANALYSES	2	2	1
I MAINTAINING SANITARY WASTE AND SEWER SYSTEMS	3	3	1
J OPERATING OR MAINTAINING WASTEWATER TREATMENT SYSTEMS	1	1	1
K PERFORMING WASTEWATER SAMPLING, TESTING, AND ANALYSIS	*	*	*
L INSTALLING OR MAINTAINING FIRE SUPPRESSION SYSTEMS	4	4	3
M MAINTAINING GAS DISTRIBUTION SYSTEMS	2	1	1
N MAINTAINING PNEUMATIC SYSTEMS	*	*	*
O OPERATING OR MAINTAINING SPECIALIZED OR FIELD WATER TREATMENT EQUIPMENT	*	*	*
P PERFORMING ENVIRONMENTAL OR SAFETY ACTIVITIES	2	3	2
Q PERFORMING PEST MANAGEMENT ACTIVITIES	*	*	*
R PERFORMING PRIME BASE ENGINEER EMERGENCY FORCE (BEEF) ACTIVITIES	4	5	6
S PERFORMING MANAGEMENT AND SUPERVISORY ACTIVITIES	2	10	36
T PERFORMING TRAINING ACTIVITIES	*	4	7
U PERFORMING GENERAL ADMINISTRATIVE AND TECHNICAL ORDER (TO) SYSTEM ACTIVITIES	*	2	6
V PERFORMING GENERAL SUPPLY AND EQUIPMENT ACTIVITIES	2	4	7

* Denotes less than 1 percent

TABLE 8

REPRESENTATIVE TASKS PERFORMED BY
DAFSC 3E431 AD PERSONNEL

TASKS		PERCENT MEMBERS PERFORMING (N=329)
A0050	Maintain hand tools	88
B0167	Cut copper pipe or tubing	84
B0179	Cut plastic pipe or tubing	83
B0190	Ream piping or tubing	83
A0052	Maintain shop equipment	81
B0144	Assemble galvanized, black iron, or steel pipe	81
A0057	Open clogged or restricted drains using power-operated augers	79
D0300	Remove or install gate valves	79
B0188	Measure pipe	79
B0156	Assemble or disassemble threaded pipe fittings	79
B0147	Assemble plastic pipe using solvent weld joints	78
A0056	Open clogged or restricted drains using hand-operated augers	75
B0169	Cut galvanized, black iron, or steel pipe, other than ductile steel pipe	74
D0290	Remove or install ball valves	73
B0154	Assemble or disassemble plastic pipe fittings	72
B0142	Assemble copper tubing using sweat solder	72
A0060	Open clogged or restricted drains using water pressure	72
A0059	Open clogged or restricted drains using vacuum pressure/forced cup plungers	71
B0145	Assemble plastic pipe using compression-type fittings	71
B0165	Cut cast iron pipe	71
B0203	Thread pipe using hand threaders	71
E0352	Locate water pipe leaks	70
B0139	Assemble copper tubing using ferruled fittings	70
E0349	Locate water mains using base maps	70
B0138	Assemble copper tubing using compression couplings	69
Average number of tasks performed		197

TABLE 9
REPRESENTATIVE TASKS PERFORMED BY
DAFSC 3E451 AD PERSONNEL

TASKS	PERCENT MEMBERS PERFORMING (N=439)
A0050 Maintain hand tools	84
A0052 Maintain shop equipment	84
B0188 Measure pipe	81
D0300 Remove or install gate valves	80
B0144 Assemble galvanized, black iron, or steel pipe	78
B0179 Cut plastic pipe or tubing	77
B0167 Cut copper pipe or tubing	77
B0190 Ream piping or tubing	77
B0156 Assemble or disassemble threaded pipe fittings	76
B0169 Cut galvanized, black iron, or steel pipe, other than ductile steel pipe	76
B0147 Assemble plastic pipe using solvent weld joints	73
B0154 Assemble or disassemble plastic pipe fittings	73
D0290 Remove or install ball valves	72
B0204 Thread pipe using mounted power threaders	72
A0057 Open clogged or restricted drains using power-operated augers	71
B0203 Thread pipe using hand threaders	71
B0142 Assemble copper tubing using sweat solder	71
V1041 Maintain shop equipment	70
D0293 Remove or install check valves	70
D0269 Inspect gate valves	69
D0299 Remove or install gate valve components	68
T0979 Conduct on-the-job training (OJT)	67
A0060 Open clogged or restricted drains using water pressure	66
E0349 Locate water mains using base maps	66
B0145 Assemble plastic pipe using compression-type fittings	66
Average number of tasks performed	245

TABLE 10

TASKS WHICH BEST DIFFERENTIATE BETWEEN DAFSC 3E431 AND DAFSC 3E451
AD PERSONNEL

TASKS	DAFSC 3E431 (N=329)	DAFSC 3E451 (N=439)	DIFFERENCE
T0979 Conduct on-the-job training (OJT)	19	67	-48
T0980 Counsel trainees on training progress	5	53	-48
T0992 Maintain training records or files	6	53	-47
S0904 Counsel subordinates concerning personal matters	5	50	-44
T0987 Evaluate trainee progress on career development courses (CDCs)	4	46	-43
S0891 Conduct supervisory performance feedback sessions	5	47	-43
S0972 Write or indorse military performance reports	3	45	-42
T0990 Evaluate progress of trainees	4	44	-41
T0976 Brief personnel concerning training programs or matters	3	42	-39
T0981 Determine training requirements	3	42	-39
S0973 Write recommendations for awards or decorations	2	41	-38
S0937 Establish performance standards for subordinates	3	41	-38
S0906 Determine or establish work assignments or priorities	14	48	-34
S0893 Conduct supervisory orientations for newly assigned personnel	4	38	-34
S0892 Conduct safety inspections of equipment or facilities	14	47	-33
S0905 Determine or establish logistics requirements, such as personnel, equipment, tools, parts, supplies, or workspace	11	43	-32
U1009 Input nouns to WIMS dictionary for CE material acquisition system (CEMAS)	8	39	-31
S0902 Coordinate work activities with other CE shops	28	60	-31
S0958 Prepare bill of materials requests	18	50	-31
S0887 Cancel or close out work information management system (WIMS) work orders	10	40	-30

TABLE 11
REPRESENTATIVE TASKS PERFORMED BY
DAFSC 3E471 AD PERSONNEL

TASKS		PERCENT MEMBERS PERFORMING (N=116)
S0972	Write or indorse military performance reports	89
S0973	Write recommendations for awards or decorations	88
S0891	Conduct supervisory performance feedback sessions	85
S0893	Conduct supervisory orientations for newly assigned personnel	84
S0902	Coordinate work activities with other CE shops	82
S0904	Counsel subordinates concerning personal matters	82
S0906	Determine or establish work assignments or priorities	80
S0905	Determine or establish logistics requirements, such as personnel, equipment, tools, parts, supplies, or workspace	79
S0886	Assign sponsors for newly assigned personnel	78
S0961	Retrieve work order data using WIMS	77
S0903	Coordinate work requirements with CE superintendents	75
S0938	Establish procedures for accountability of equipment, tools, parts, or supplies	74
S0945	Implement safety or security programs	73
S0940	Evaluate job hazards or compliance with Air Force Occupational Safety and Health (AFOSH) program	73
S0892	Conduct safety inspections of equipment or facilities	73
S0947	Initiate actions required due to substandard performance of personnel	72
S0937	Establish performance standards for subordinates	72
S0967	Schedule personnel for temporary duty (TDY) assignments, leaves, or passes	71
T0981	Determine training requirements	71
S0943	Evaluate maintenance or utilization of equipment, tools, parts, supplies, or workspace	70
S0888	Conduct general meetings, such as staff meetings, briefings, conferences, or workshops	69
S0942	Evaluate work schedules or work load requirements	68
T0976	Brief personnel concerning training programs or matters	68
T0995	Select personnel for specialized training	67
S0889	Conduct self-inspections or self-assessments	67
Average number of tasks performed		210

TABLE 12

TASKS WHICH BEST DIFFERENTIATE BETWEEN
DAFSC 3E451 AND DAFSC 3E471
AD PERSONNEL

TASKS	DAFSC 3E451 (N=329)	DAFSC 3E471 (N=439)	DIFFERENCE
B0190 Ream piping or tubing	77	37	40
D0300 Remove or install gate valves	80	42	38
B0169 Cut galvanized, black iron, or steel pipe, other than ductile steel pipe	76	40	36
B0179 Cut plastic pipe or tubing	77	41	36
D0290 Remove or install ball valves	72	37	35
B0204 Thread pipe using mounted power threaders	72	37	35
B0144 Assemble galvanized, black iron, or steel pipe	78	43	35
S0886 Assign sponsors for newly assigned personnel	22	78	-56
S0967 Schedule personnel for temporary duty (TDY) assignments, leaves, or passes	21	71	-49
S0973 Write recommendations for awards or decorations	41	88	-47
S0893 Conduct supervisory orientations for newly assigned personnel	38	84	-46
T0995 Select personnel for specialized training	21	67	-46
S0962 Review budget requirements	9	55	-46
S0940 Evaluate job hazards or compliance with Air Force Occupational Safety and Health (AFOSH) program	31	73	-43
S0910 Develop self-inspection or self-assessment program checklists	18	60	-43
U1005 Initiate or maintain standby rosters or workcenter pyramid recall rosters	18	61	-43
S0946 Initiate personnel action requests	14	57	-43
S0974 Write replies to inspection reports	16	59	-43
S0942 Evaluate work schedules or work load requirements	25	68	-43

TABLE 13

DISTRIBUTION OF ANG SKILL-LEVEL MEMBERS
ACROSS CAREER LADDER JOBS

<u>JOB</u>	<u>DAFSC 3E431 (N=1)</u>	<u>DAFSC 3E451 (N=168)</u>	<u>DAFSC 3E471 (N=124)</u>
EXTERIOR PLUMBING JOB	-	-	-
GENERAL PLUMBER CLUSTER	-	103	88
BAREBASE SYSTEMS INSTALLATION JOB	-	1	2
BAREBASE SYTEMS MAINTENANCE JOB	-	2	-
FIELD WATER SYSTEMS JOB	-	-	3
WATER TREATMENT TECHNICIAN JOB	-	1	1
WASTEWATER TREATMENT JOB	-	1	-
POOL MAINTENANCE JOB	-	-	-
FIRE SUPPRESSION JOB	-	-	-
TEAM LEADER JOB	-	-	-
OJT TRAINERS JOB	-	-	3
MANAGEMENT AND SUPERVISORY JOB	-	-	7
NOT GROUPED	1	60	20

TABLE 14

TIME SPENT ON DUTIES BY ANG MEMBERS OF SKILL-LEVEL GROUPS
(RELATIVE PERCENT OF JOB TIME)

<u>JOB</u>	<u>DAFSC 3E431 (N=1)</u>	<u>DAFSC 3E451 (N=168)</u>	<u>DAFSC 3E471 (N=124)</u>
A Performing General Operations Or Maintenance Activities	15	20	14
B Installing Or Replacing Pipe, Tubing, Fittings, Or Appurtenances	0	26	21
C Installing Or Maintaining Plumbing Fixtures And Equipment	23	13	10
D Maintaining Valves	15	12	10
E Maintaining Water Distribution Systems	5	3	2
F Operating Or Maintaining Installation Water Treatment	0	*	1
G Operating Or Maintaining Swimming Pools	0	*	*
H Performing Water Sampling, Testing, And Analyses	0	2	1
I Maintaining Sanitary Waste And Sewer Systems	2	1	1
J Operating Or Maintaining Wastewater Treatment Systems	0	1	1
K Performing Wastewater Sampling, Testing, And Analysis	0	*	*
L Installing Or Maintaining Fire Suppression Systems	0	*	*
M Maintaining Gas Distribution Systems	*	*	1
N Maintaining Pneumatic Systems	0	*	1
O Operating Or Maintaining Specialized Or Field Water Treatment Equipment	*	*	*
P Performing Environmental Or Safety Activities	*	2	2
Q Performing Pest Management Activities	4	*	*
R Performing Prime Base Engineer Emergency Force (Beef) Activities	3	10	10
S Performing Management And Supervisory Activities	9	2	9
T Performing Training Activities	4	2	9
U Performing General Administrative And Technical Order (To) System Activities	2	*	1
V Performing General Supply And Equipment Activities	15	3	3

* Denotes less than 1 percent

TABLE 15
REPRESENTATIVE TASKS PERFORMED BY
DAFSC 3E451 ANG PERSONNEL

TASKS	PERCENT MEMBERS PERFORMING (N=168)
A0056 Open clogged or restricted drains using hand-operated augers	82
B0167 Cut copper pipe or tubing	81
A0050 Maintain hand tools	78
A0043 Inspect plumbing fixtures	77
B0190 Ream piping or tubing	77
B0179 Cut plastic pipe or tubing	77
B0142 Assemble copper tubing using sweat solder	75
B0147 Assemble plastic pipe using solvent weld joints	73
C0246 Remove or install urinals	72
B0188 Measure pipe	70
A0052 Maintain shop equipment	70
C0238 Remove or install flushometer-type water closets	69
A0086 Remove or install flushometers	68
A0057 Open clogged or restricted drains using power-operated augers	68
D0296 Remove or install faucets	67
B0203 Thread pipe using hand threaders	65
C0250 Remove or install water fountains	65
C0249 Remove or install water fountain components	65
D0297 Remove or install flushometer valve components	64
B0156 Assemble or disassemble threaded pipe fittings	64
D0327 Remove or install water closet tank float valves	64
D0328 Remove or install water closet tank flush valve components	64
B0140 Assemble copper tubing using flared fittings	64
B0144 Assemble galvanized, black iron, or steel pipe	64
B0204 Thread pipe using mounted power threaders	64
Average number of tasks performed	149

TABLE 16

REPRESENTATIVE TASKS PERFORMED BY
DAFSC 3E471 ANG PERSONNEL

TASKS		PERCENT MEMBERS PERFORMING (N=124)
B0167	Cut copper pipe or tubing	85
A0056	Open clogged or restricted drains using hand-operated augers	82
B0188	Measure pipe	81
D0296	Remove or install faucets	81
B0142	Assemble copper tubing using sweat solder	80
B0147	Assemble plastic pipe using solvent weld joints	78
B0179	Cut plastic pipe or tubing	77
D0295	Remove or install faucet components	76
A0043	Inspect plumbing fixtures	75
C0246	Remove or install urinals	75
D0297	Remove or install flushometer valve components	75
A0057	Open clogged or restricted drains using power-operated augers	74
B0156	Assemble or disassemble threaded pipe fittings	74
B0144	Assemble galvanized, black iron, or steel pipe	73
B0203	Thread pipe using hand threaders	73
A0050	Maintain hand tools	73
B0190	Ream piping or tubing	71
R0879	Set up or tear down tents	71
A0086	Remove or install flushometers	69
B0169	Cut galvanized, black iron, or steel pipe, other than ductile steel pipe	69
B0178	Cut openings in wood structures using power tools	69
A0052	Maintain shop equipment	69
B0204	Thread pipe using mounted power threaders	69
D0329	Remove or install water closet tank flush valves	69
B0195	Remove or install pipe hangers or pipe straps	69
Average number of tasks performed		205

TABLE 17

TASKS WHICH BEST DIFFERENTIATE BETWEEN
DAFSC 3E451 AND DAFSC 3E471
ANG PERSONNEL

TASKS	DAFSC 3E451 ANG (N=168)	DAFSC 3E471 ANG (N=124)	DIFFERENCE
S0906 Determine or establish work assignments or priorities	10	56	-47
T0992 Maintain training records or files	21	65	-44
T0980 Counsel trainees on training progress	13	57	-44
S0893 Conduct supervisory orientations for newly assigned personnel	4	48	-44
T0990 Evaluate progress of trainees	14	57	-43
T0987 Evaluate trainee progress on career development courses (CDCs)	13	54	-42
S0905 Determine or establish logistics requirements, such as personnel, equipment, tools, parts, supplies, or workspace	11	51	-40
S0904 Counsel subordinates concerning personal matters	9	48	-39
T0981 Determine training requirements	9	48	-39
S0902 Coordinate work activities with other CE shops	17	55	-38
S0903 Coordinate work requirements with CE superintendents	12	49	-37
T0979 Conduct on-the-job training (OJT)	27	61	-35
T0976 Brief personnel concerning training programs or matters	10	44	-34
S0973 Write recommendations for awards or decorations	4	36	-32
T0983 Develop training programs, plans, or procedures	7	39	-32
S0891 Conduct supervisory performance feedback sessions	2	35	-32
V1039 Inventory equipment, tools, parts, or supplies	29	49	-20
R0848 Perform bomb damage repairs, other than crater repairs	9	29	-20
C0255 Review engineering drawings or specifications to determine plumbing installation methods	41	61	-20
S0886 Assign sponsors for newly assigned personnel	5	25	-20
T0996 Write training reports	5	25	-20

TABLE 18
DISTRIBUTION OF SKILL-LEVEL AFRC MEMBERS
ACROSS CAREER LADDER JOBS

<u>JOB</u>	DAFSC 3E431 (N=2)	DAFSC 3E451 (N=90)	DAFSC 3E471 (N=56)
EXTERIOR PLUMBING JOB	-	-	-
GENERAL PLUMBER CLUSTER	1	32	37
BAREBASE SYSTEMS INSTALLATION JOB	-	1	-
BAREBASE SYTEMS MAINTENANCE JOB	-	2	-
FIELD WATER SYSTEMS JOB	-	6	2
WATER TREATMENT TECHNICIAN JOB	-	1	1
WASTEWATER TREATMENT JOB	-	-	-
POOL MAINTENANCE JOB	-	-	-
FIRE SUPPRESSION JOB	-	-	-
TEAM LEADER JOB	-	-	-
OJT TRAINERS JOB	-	1	1
MANAGEMENT AND SUPERVISORY JOB	-	-	5
NOT GROUPED	1	47	10

TABLE 19

TIME SPENT ON DUTIES BY AFRC MEMBERS OF SKILL-LEVEL GROUPS
(RELATIVE PERCENT OF JOB TIME)

<u>JOB</u>	<u>DAFSC 3E431 (N=2)</u>	<u>DAFSC 3E451 (N=90)</u>	<u>DAFSC 3E471 (N=56)</u>
A Performing General Operations Or Maintenance Activities	16	17	13
B Installing Or Replacing Pipe, Tubing, Fittings, Or Appurtenances	42	19	19
C Installing Or Maintaining Plumbing Fixtures And Equipment	19	10	8
D Maintaining Valves	13	8	8
E Maintaining Water Distribution Systems	1	2	2
F Operating Or Maintaining Installation Water Treatment	1	1	1
G Operating Or Maintaining Swimming Pools	*	1	*
H Performing Water Sampling, Testing, And Analyses	1	2	2
I Maintaining Sanitary Waste And Sewer Systems	0	*	1
J Operating Or Maintaining Wastewater Treatment Systems	*	1	1
K Performing Wastewater Sampling, Testing, And Analysis	*	*	*
L Installing Or Maintaining Fire Suppression Systems	0	1	*
M Maintaining Gas Distribution Systems	1	*	*
N Maintaining Pneumatic Systems	0	*	*
O Operating Or Maintaining Specialized Or Field Water Treatment Equipment	0	*	*
P Performing Environmental Or Safety Activities	0	2	2
Q Performing Pest Management Activities	0	*	*
R Performing Prime Base Engineer Emergency Force (Beef) Activities	4	20	12
S Performing Management And Supervisory Activities	*	5	13
T Performing Training Activities	0	5	9
U Performing General Administrative And Technical Order (To) System Activities	0	1	2
V Performing General Supply And Equipment Activities	1	3	3

* Denotes less than 1 percent

TABLE 20

REPRESENTATIVE TASKS PERFORMED BY
DAFSC 3E451 AFRC PERSONNEL

TASKS	PERCENT MEMBERS PERFORMING (N=90)
R0879 Set up or tear down tents	69
A0050 Maintain hand tools	68
B0147 Assemble plastic pipe using solvent weld joints	61
A0056 Open clogged or restricted drains using hand-operated augers	61
B0142 Assemble copper tubing using sweat solder	59
A0043 Inspect plumbing fixtures	59
B0167 Cut copper pipe or tubing	57
R0877 Set up water storage bladders	53
B0179 Cut plastic pipe or tubing	53
R0835 Lay AM-2 matting	52
B0190 Ream piping or tubing	52
B0188 Measure pipe	51
C0238 Remove or install flushometer-type water closets	51
C0250 Remove or install water fountains	50
D0296 Remove or install faucets	50
A0052 Maintain shop equipment	49
D0327 Remove or install water closet tank float valves	49
A0057 Open clogged or restricted drains using power-operated augers	48
R0878 Set up or tear down ROWPUs	48
B0177 Cut openings in wood structures using hand tools	48
D0297 Remove or install flushometer valve components	48
A0059 Open clogged or restricted drains using vacuum pressure/forced cup plungers	47
D0295 Remove or install faucet components	47
D0326 Remove or install water closet tank float valve components	47
C0246 Remove or install urinals	47
Average number of tasks performed	126

TABLE 21

REPRESENTATIVE TASKS PERFORMED BY
DAFSC 3E471 AFRC PERSONNEL

TASKS	PERCENT MEMBERS PERFORMING (N=56)
B0188 Measure pipe	77
R0879 Set up or tear down tents	77
B0179 Cut plastic pipe or tubing	75
T0980 Counsel trainees on training progress	73
B0167 Cut copper pipe or tubing	73
A0050 Maintain hand tools	71
A0043 Inspect plumbing fixtures	71
B0142 Assemble copper tubing using sweat solder	71
C0246 Remove or install urinals	71
R0878 Set up or tear down ROWPUs	70
D0296 Remove or install faucets	70
B0203 Thread pipe using hand threaders	70
T0979 Conduct on-the-job training (OJT)	68
A0056 Open clogged or restricted drains using hand-operated augers	68
B0158 Backfill trenches	68
R0873 Set up HB, HE, or HF field shower units	68
R0874 Set up HB, HE, or HF field latrines	68
D0300 Remove or install gate valves	68
T0992 Maintain training records or files	66
B0147 Assemble plastic pipe using solvent weld joints	66
C0249 Remove or install water fountain components	66
R0880 Tear down bare base structures	66
C0250 Remove or install water fountains	66
B0138 Assemble copper tubing using compression couplings	64
B0190 Ream piping or tubing	64
Average number of tasks performed	210

TABLE 22

TASKS WHICH BEST DIFFERENTIATE BETWEEN
DAFSC 3E451 AND DAFSC 3E471
AFRC PERSONNEL

TASKS	DAFSC 3E451 AFRC (N=90)	DAFSC 3E471 AFRC (N=56)	DIFFERENCE
T0980	23	73	-50
S0906	12	59	-47
S0904	10	57	-47
T0981	17	63	-46
S0891	6	52	-46
T0987	18	63	-45
S0893	10	55	-45
S0942	7	46	-40
T0990	19	57	-38
S0902	16	52	-36
S0905	13	48	-35
T0992	31	66	-35
S0973	12	46	-34
C0249	46	66	-21
S0908	4	25	-21
S0940	17	38	-21
B0171	30	50	-20
C0206	42	63	-20
D0277	19	39	-20
B0164	28	48	-20

TABLE 23

TASKS WHICH BEST DIFFERENTIATE BETWEEN
DAFSC 3E4X1 ANG AND AFRC PERSONNEL

TASKS	DAFSC 3E4X1 ANG (N=293)	DAFSC 3E4X1 AFRC (N=148)	DIFFERENCE
A0086 Remove or install flushometers	69	43	26
A0055 Open clogged or restricted drains using chemicals	54	32	23
B0144 Assemble galvanized, black iron, or steel pipe	68	47	21
C0234 Remove or install emergency eyewasher components	53	33	20
C0224 Remove or install commercial lavatories	53	32	20
C0235 Remove or install emergency eyewashers	55	36	19
C0225 Remove or install commercial lavatory components	51	32	19
C0237 Remove or install emergency showers	51	32	19
B0167 Cut copper pipe or tubing	82	64	19
A0057 Open clogged or restricted drains using power-operated augers	71	53	18
P0779 Inspect shop emergency eyewashers	41	23	18
R0825 Harden shelters	26	37	-12
R0835 Lay AM-2 matting	41	53	-12
R0856 Perform expedient beddown	28	40	-12
R0880 Tear down bare base structures	41	52	-11
R0882 Transport emergency water	33	45	-11

TABLE 24

RELATIVE PERCENT OF TIME SPENT ACROSS DUTIES BY
FIRST-ENLISTMENT AFSC 3E4X1 AD PERSONNEL
(N-352)

<u>DUTY AREA</u>	<u>PERCENT TIME SPENT</u>
A Performing General Operations Or Maintenance Activities	22
B Installing Or Replacing Pipe, Tubing, Fittings, Or Appurtenances	20
C Installing Or Maintaining Plumbing Fixtures And Equipment	9
D Maintaining Valves	14
E Maintaining Water Distribution Systems	6
F Operating Or Maintaining Installation Water Treatment	1
G Operating Or Maintaining Swimming Pools	3
H Performing Water Sampling, Testing, And Analyses	2
I Maintaining Sanitary Waste And Sewer Systems	3
J Operating Or Maintaining Wastewater Treatment Systems	1
K Performing Wastewater Sampling, Testing, And Analysis	*
L Installing Or Maintaining Fire Suppression Systems	4
M Maintaining Gas Distribution Systems	2
N Maintaining Pneumatic Systems	*
O Operating Or Maintaining Specialized Or Field Water Treatment Equipment	*
P Performing Environmental Or Safety Activities	2
Q Performing Pest Management Activities	*
R Performing Prime Base Engineer Emergency Force (Beef) Activities	4
S Performing Management And Supervisory Activities	2
T Performing Training Activities	*
U Performing General Administrative And Technical Order (To) System Activities	*
V Performing General Supply And Equipment Activities	2

TABLE 25

REPRESENTATIVE TASKS PERFORMED BY
FIRST-ENLISTMENT AFSC 3E4X1 PERSONNEL

<u>TASKS</u>		PERCENT MEMBERS PERFORMING (N=352)
A0050	Maintain Hand Tools	87
A0052	Maintain Shop Equipment	82
A0059	Open Clogged Or Restricted Drains Using Vacuum Pressure/Forced Cup Plunger	71
A0057	Open Clogged Or Restricted Drains Using Power-Operated Augers	78
A0005	Adjust Flushometers	68
A0056	Open Clogged Or Restricted Drains Using Hand-Operated Augers	74
B0188	Measure Pipe	79
A0086	Remove Or Install Flushometers	66
B0167	Cut Copper Pipe Or Tubing	82
B0147	Assemble Plastic Pipe Using Solvent Weld Joints	78
A0060	Open Clogged Or Restricted Drains Using Water Pressure	72
B0179	Cut Plastic Pipe Or Tubing	82
A0043	Inspect Plumbing Fixtures	69

TABLE 26

REPRESENTATIVE EQUIPMENT ITEMS USED BY MORE THAN 20 PERCENT OF
FIRST-ENLISTMENT AFSC 3E4X1 PERSONNEL

<u>EQUIPMENT</u>	<u>PERCENT MEMBERS USING (N=352)</u>
PIPE WRENCHES	97
LEATHERMAN	95
GATE VALVES	93
LADDERS	92
BALL-PEEN HAMMERS	89
CHISELS	88
ELECTRIC DRILLS	88
HAND TOOLS	88
SHOVELS	88
VALVE KEYS	88
BALL VALVES	87
ALLEN WRENCHES	85
FORD WRENCHES	84
PIPE VISES	84
STEEL RIBBON TAPE SNAKES	84
GLOBE VALVES	83
SAFETY EQUIPMENT	82
BASIN WRENCHES	81
LEVELS	81
SLEDGE HAMMERS	80
TUBING CUTTERS	80
PVC CUTTERS	79
BENCH THREADERS	78
HYDRANT WRENCHES	78
CLAW HAMMERS	77
DIAPHRAGM PUMPS	77
GENERAL PURPOSE VEHICLES	76
FLARING TOOLS	75

TABLE 27

TASKS RATED HIGHEST IN TRAINING EMPHASIS

TASKS	PERCENT MEMBERS PERFORMING			TASK DIFF**
	TNG EMP*	1 ST JOB (N=209)	1 ST ENL (N=352)	
A0056	5.80	77	78	4.81
E0349	5.80	67	71	4.70
C0246	5.55	60	62	4.73
R0883	5.50	21	26	7.02
B0142	5.45	66	72	4.53
R0878	5.43	31	35	5.99
E0339	5.40	36	43	5.26
R0820	5.35	23	27	5.44
D0278	5.35	61	67	4.52
E0342	5.35	43	48	5.84
B0147	5.32	77	78	3.33
R0807	5.28	22	26	5.96
E0346	5.28	22	26	5.96
B0144	5.25	78	79	4.05
A0056	5.20	71	74	3.92
R0869	5.18	17	22	5.81
E0356	5.18	40	47	5.88

* Mean TE Rating is 2.25 , and Standard Deviation is 1.38 (High TE = 3.63)

** Average TD Rating is 5.00

TABLE 28

TASKS RATED HIGHEST IN TASK DIFFICULTY

TASKS	TASK	PERCENT MEMBERS PERFORMING					
		1ST	1ST	5-SKL	7-SKL	TNG	EMP
		JOB (N=209)	ENL (N=352)	LVL (N=439)	LVL (N=116)		
	DIFF						
R0883	Troubleshoot ROWPUs	21	26	35	36	5.50	
L0663	Install or extend fixed-gaseous fire suppression systems	3	4	6	7	2.17	
K0602	Perform mix liquor volatile solids (MLVS) tests of wastewater sample	2	3	2	3	.68	
S0924	Direct installation, maintenance, or modifications of fire suppression systems	4	8	21	38	2.05	
L0700	Troubleshoot fixed-gaseous fire suppression systems	4	6	9	7	2.42	
L0664	Install or extend foam fire suppression systems	5	6	10	8	2.70	
K0601	Perform mix liquor suspended solids (MLSS) tests of wastewater samples	1	3	3	3	.68	
K0597	Perform coliform bacteriological tests of wastewater samples	1	2	3	2	1.45	
M0735	Tap into gas mains	14	15	18	12	3.45	
L0702	Troubleshoot preaction fire suppression systems	6	11	18	16	3.50	

* Mean TE Rating is 2.25 , and Standard Deviation is 1.38 (High TE = 3.63)

** Average TD Rating is 5.00

TABLE 29

**EXAMPLES OF TECHNICAL TASKS PERFORMED BY AFSC 3E4X1 GROUP MEMBERS
SUGGESTED FOR DELETION FROM STS**

TASKS	3-SKL LVL	1 st JOB Course (N=209)	PERCENT MEMBERS PERFORMING				TASK DIFF	ATI
			5-SKL LVL	7-SKL LVL	1 st ENL (N=439)	TNG EMP		
9.5.1. Apply safety practices when working with - Electrical systems and equipment	2b/1a							
A0114 Test electric motors using clamp-on ammeters		6	12	16	9	2.95	5.56	7
A0115 Test electric motors using electrical voltmeters		6	16	16	10	3.10	5.74	7
A0116 Test electric motors using ohmmeters		5	15	16	9	2.70	5.76	7
20.3. Electric Motors - Check for proper operation	2b							
A0114 Test electric motors using clamp-on ammeters		6	12	16	9	2.95	5.56	7
A0115 Test electric motors using electrical voltmeters		6	16	16	10	3.10	5.74	7
A0116 Test electric motors using ohmmeters		5	15	16	9	2.70	5.76	7
25.2.3. Water Testing - Total dissolved solids	3c/1a							
H0454 Perform total dissolved solids tests of water samples		9	12	4	11	2.05	5.36	2
25.2.4. Perform water test - Fluoride	3c/2b							
H0438 Perform Fluoride test of water samples		17	15	9	19	2.55	5.06	7

* Mean TE Rating is 2.25, and Standard Deviation is 1.38 (High TE = 3.63)

** Average TD Rating is 5.00

TABLE 30

TECHNICAL TASKS PERFORMED BY 20 PERCENT OR MORE
CRITERION GROUP PERSONNEL AND NOT RERERENCED TO THE STS

PERCENT MEMBERS PERFORMING							TNG EMP	TASK DIFF	ATI
TASKS	1 ST JOB	1 ST ENL	3E451	3E471					
A0047	Inspect water or wastewater system buildings or structures	28	32	34	38		2.28	4.68	15
A0055	Open clogged or restricted drains using chemicals	38	40	34	17		3.38	4.03	15
A0075	Remove or install booster pumps	24	30	36	22		2.80	5.80	15
A0083	Remove or install electric motors	25	32	35	26		2.70	5.56	15
A0100	Remove or install sprinkler system components	26	32	33	25		2.90	4.33	15
C0217	Remove or install commercial food grinder or disposal	31	34	32	13		2.95	5.37	15
C0231	Remove or install domestic lavatories	51	52	47	28		3.75	4.69	18
C0232	Remove or install domestic sinks	54	54	49	29		3.95	4.57	18
C0238	Remove or install flushometer-type water closets	61	62	55	32		4.95	4.42	18
C0248	Remove or install wall-hung sinks	56	57	54	29		4.95	4.58	18
D0262	Clean check valves	39	44	55	32		3.25	4.19	15
D0275	Inspect pressure relief valves	34	38	43	31		2.85	4.33	15
D0332	Repair water main valves	49	56	51	33		1.57	5.04	18
E0349	Locate water mains using base maps	67	71	66	52		5.80	4.70	18

* Mean TE Rating is 2.25 , and Standard Deviation is 1.38 (High TE = 3.63)

** Average TD Rating is 5.00

TABLE 31

EXAMPLES OF AFSC 3E4X1 POI ITEMS
SUGGESTED FOR REDUCTION OF PROFICIENCY CODING OR DELETION
(LOW PERCENTAGES OF MEMBERS PERFORMING)

TASKS		1 st JOB	1 st ENL	TNG EMP	TASK DIFF	ATI
I.5.c	Project Planning – prepare a bill of materials					
S0958	Prepare bill of material request	15	19	3.33	5.42	7
VI.4.e	Air Force Occupational Safety and Health (AFOSH) Program					
	Fundamentals – inspect manhole					
A0064	Perform methane gas tests for confined spaces	11	17	4.47	5.82	11
P0769	Change air-supplied or in-line respirator system filters	5	6	2.53	4.98	7
P0770	Change respirator filters, other than air-supplied or in-line	8	9	2.62	4.56	7
P0774	Inspect condition of respirator harness	14	18	3.22	4.53	7
P0777	Inspect confined space entry tripods	22	27	4.18	4.41	11

* Mean TE Rating is 2.25 , and Standard Deviation is 1.38 (High TE = 3.63)

** Average TD Rating is 5.00

TABLE 32

EXAMPLES OF TECHNICAL TASKS PERFORMED BY 30 PERCENT OR MORE
FIRST-ENLISTMENT PERSONNEL AND NOT REFERENCED TO THE POI

PERCENT MEMBERS
PERFORMING

TASKS	1 ST JOB	1 ST ENL	TNG EMP	TASK DIFF	ATI
A0047 Inspect water or wastewater system buildings or structures	28	32	2.28	4.68	15
A0055 Open clogged or restricted drains using chemicals	38	40	3.38	4.03	15
A0075 Remove or install booster pumps	24	30	2.80	5.80	15
A0083 Remove or install electric motors	25	32	2.70	5.56	15
A0100 Remove or install sprinkler system components	26	32	2.90	4.33	15
C0217 Remove or install commercial food grinder or disposal	31	34	2.95	5.37	15
C0231 Remove or install domestic lavatories	51	52	3.75	4.69	18
C0232 Remove or install domestic sinks	54	54	3.95	4.57	18
C0238 Remove or install flushometer-type water closets	61	62	4.95	4.42	18
C0248 Remove or install wall-hung sinks	56	57	4.95	4.58	18
D0262 Clean check valves	39	44	3.25	4.19	15
D0275 Inspect pressure relief valves	34	38	2.85	4.33	15
D0332 Repair water main valves	49	56	1.57	5.04	18
E0349 Locate water mains using base maps	67	71	5.80	4.70	18

* Mean TE Rating is 2.25 , and Standard Deviation is 1.38 (High TE = 3.63)

** Average TD Rating is 5.00

TABLE 33

COMPARISON OF JOB SATISFACTION INDICATORS BY TAFMS GROUPS (PERCENT MEMBERS RESPONDING)

	1-48 MOS TAFMS		49-96 MOS TAFMS		97+ MOS TAFMS	
	1999 3E4X1 (N=352)	COMP SAMPLE* (N=249)	1999 3E4X1 (N=149)	COMP SAMPLE* (N=190)	1999 3E4X1 (N=383)	COMP SAMPLE* (N=383)
<u>EXPRESSED JOB INTEREST:</u>						
INTERESTING	64	77	65	80	79	81
SO-SO	20	13	23	10	15	12
DULL	16	10	12	10	6	7
<u>PERCEIVED UTILIZATION OF TALENTS:</u>						
FAIRLY WELL TO PERFECTLY	72	84	83	82	86	83
LITTLE OR NOT AT ALL	28	16	17	18	14	17
<u>PERCEIVED UTILIZATION OF TRAINING</u>						
FAIRLY WELL TO PERFECTLY	86	88	81	85	84	81
LITTLE OR NOT AT ALL	14	12	19	15	16	19
<u>SENSE OF ACCOMPLISHMENT GAINED</u>						
FROM WORK:						
SATISFIED	65	74	73	72	77	73
NEUTRAL	17	10	13	12	10	9
DISSATISFIED	18	16	14	16	13	18
<u>REENLISTMENT INTENTIONS:</u>						
YES, OR PROBABLY YES	42	47	68	56	74	72
NO, OR PROBABLY NO	57	53	31	44	8	11
PLAN TO RETIRE	1	0	1	0	18	17

* Comparative sample of Support career ladders surveyed in 1998 include the 3NOX1, 3N0X2, and 3V0X2 AFSCs.

TABLE 34

COMPARISON OF JOB SATISFACTION INDICATORS FOR AFSC 3E4X1
TAFMS GROUPS IN CURRENT STUDY TO PREVIOUS STUDY
(PERCENT MEMBERS RESPONDING)

	1-48 MOS TAFMS		49-96 MOS TAFMS		97+ MOS TAFMS	
	1999 3E4X1 (N=352)	1995 3E4X1 (N=452)	1999 3E4X1 (N=149)	1995 3E4X1 (N=281)	1999 3E4X1 (N=383)	1995 3E4X1 (N=62)
<u>EXPRESSED JOB INTEREST:</u> INTERESTING SO-SO DULL	64	64	65	65	79	69
	20	25	23	23	15	22
	16	11	12	12	6	9
<u>PERCEIVED UTILIZATION OF TALENTS:</u> FAIRLY WELL TO PERFECTLY LITTLE OR NOT AT ALL	72	78	83	84	86	82
	28	22	17	15	14	18
<u>PERCEIVED UTILIZATION OF TRAINING:</u> FAIRLY WELL TO PERFECTLY LITTLE OR NOT AT ALL	85	81	81	67	84	70
	15	19	19	33	16	30
<u>SENSE OF ACCOMPLISHMENT GAINED FROM WORK:</u> SATISFIED NEUTRAL DISSATISFIED	65	76	73	70	77	72
	17	12	13	11	10	12
	18	12	14	19	13	16
<u>REENLISTMENT INTENTIONS:</u> YES, OR PROBABLY YES NO, OR PROBABLY NO PLAN TO RETIRE	42	56	68	70	74	69
	57	42	31	30	8	14
	1	0	1	0	18	17

TABLE 35

COMPARISON OF JOB SATISFACTION INDICATORS BY SPECIALTY JOBS (AD)
(PERCENT MEMBERS RESPONDING)

Exterior Plumbing Job (N=30)	General Plumber Cluster (N=600)	Barebase Sys Maintenance Job (N=9)	Barebase Sys Installation Job (N=3)	Field Wtr Systems Job (N=1)	Water Trt Technician Job (N=1)
67	72	45	0	100	0
13	19	33	33	0	0
20	9	22	67	0	100
70	82	56	67	100	100
30	18	44	33	0	0
80	87	44	67	100	100
20	13	56	33	0	0
73	75	67	33	100	0
10	13	0	67	0	100
17	12	33	0	0	0
47	61	44	33	100	0
50	33	56	67	0	100
3	6	0	0	0	0

EXPRESSED JOB INTEREST:

INTERESTING

SO-SO

DULL

PERCEIVED UTILIZATION OF TALENTS:

FAIRLY WELL TO PERFECTLY

LITTLE OR NOT AT ALL

PERCEIVED UTILIZATION OF TRAINING:

FAIRLY WELL TO PERFECTLY

LITTLE OR NOT AT ALL

SENSE OF ACCOMPLISHMENT GAINED FROM WORK:

SATISFIED

NEUTRAL

DISSATISFIED

REENLISTMENT INTENTIONS:

YES, OR PROBABLY YES

NO, OR PROBABLY NO

WILL RETIRE

TABLE 35 (CONTINUED)

COMPARISON OF JOB SATISFACTION INDICATORS BY SPECIALTY JOBS (AD)
(PERCENT MEMBERS RESPONDING)

Wastewater Treatment Job (N=4)	Pool Maintenance Job (N=22)	Fire Suppression Job (N=8)	Team Leader Job (N=6)	OJT Trainers Job (N=1)	Management Supervisory Job (N=66)
75	77	75	100	100	85
25	18	13	0	0	12
0	5	13	0	0	3
100	77	75	67	100	92
0	23	25	33	0	8
75	86	75	67	100	85
25	14	25	33	0	15
75	73	25	100	100	82
25	18	25	0	0	6
0	9	50	0	0	12
50	68	50	67	100	64
25	27	37	33	0	3
25	5	13	0	0	33

EXPRESSED JOB INTEREST:

INTERESTING

SO-SO

DULL

PERCEIVED UTILIZATION OF TALENTS:

FAIRLY WELL TO PERFECTLY

LITTLE OR NOT AT ALL

PERCEIVED UTILIZATION OF TRAINING:

FAIRLY WELL TO PERFECTLY

LITTLE OR NOT AT ALL

SENSE OF ACCOMPLISHMENT GAINED FROM WORK:

SATISFIED

NEUTRAL

DISSATISFIED

REENLISTMENT INTENTIONS:

YES, OR PROBABLY YES

NO, OR PROBABLY NO

WILL RETIRE

TABLE 36

COMPARISON OF JOB SATISFACTION INDICATORS BY SPECIALTY JOBS (ANG)
(PERCENT MEMBERS RESPONDING)

Field Wtr Systems Job (N=3)	Barebase Sys Installation Job (N=3)	General Plumber Cluster (N=191)	Barebase Sys Maintenance Job (N=2)	OJT Trainers Job (N=3)	Management Supervisory Job (N=7)	Wastewater Treatment Job (N=1)	Water Trt Technici an Job (N=2)
100	67	83	50	100	100	0	100
0	33	13	50	0	0	0	0
0	0	4	0	0	0	100	0
100	67	87	100	100	85	0	100
0	33	13	0	0	15	100	0
100	67	87	0	100	86	0	100
0	33	13	100	0	14	100	0
100	100	85	0	100	86	0	100
0	0	7	50	0	14	0	0
0	0	8	50	0	0	100	0

EXPRESSED JOB INTEREST:INTERESTING
SO-SO
DULLPERCEIVED UTILIZATION OF TALENTS:FAIRLY WELL TO PERFECTLY
LITTLE OR NOT AT ALLPERCEIVED UTILIZATION OF TRAINING:FAIRLY WELL TO PERFECTLY
LITTLE OR NOT AT ALLSENSE OF ACCOMPLISHMENT GAINEDFROM WORK:
SATISFIED
NEUTRAL
DISSATISFIED

TABLE 37

COMPARISON OF JOB SATISFACTION INDICATORS BY SPECIALTY JOBS (AFRC)
(PERCENT MEMBERS RESPONDING)

General Plumber Cluster (N=70)	Barebase Sys Maintenance Job (N=2)	Barebase Sys Installation Job (N=1)	OJT Trainers Job (N=2)	Management Supervisory Job (N=5)	Field Wtr Systems Job (N=8)	Water Trt Technician Job (N=2)
86	100	0	100	100	38	100
13	0	100	0	0	38	0
1	0	0	0	0	24	0
78	100	0	100	100	50	100
22	0	100	0	0	50	0
74	100	100	100	100	63	100
26	0	0	0	0	37	0
73	100	0	100	80	50	100
11	0	0	0	0	38	0
16	0	100	0	20	12	0

EXPRESSED JOB INTEREST:

INTERESTING

SO-SO

DULL

PERCEIVED UTILIZATION OF TALENTS:

FAIRLY WELL TO PERFECTLY

LITTLE OR NOT AT ALL

PERCEIVED UTILIZATION OF TRAINING:

FAIRLY WELL TO PERFECTLY

LITTLE OR NOT AT ALL

SENSE OF ACCOMPLISHMENT GAINEDFROM WORK:

SATISFIED

NEUTRAL

DISSATISFIED

APPENDIX B

**SELECTED REPRESENTATIVE TASKS PERFORMED BY
MEMBERS OF CAREER LADDER JOBS**

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TABLE B1
EXTERIOR PLUMBING JOB

TASKS		PERCENT MEMBERS PERFORMING (N=30)
E0349	Locate water mains using base maps	97
A0050	Maintain hand tools	97
B0188	Measure pipe	93
A0052	Maintain shop equipment	93
B0158	Backfill trenches	90
D0332	Repair water main valves	90
D0325	Remove or install valve boxes	90
A0010	Barricade around excavations	90
B0169	Cut galvanized, black iron, or steel pipe, other than ductile steel pipe	90
B0165	Cut cast iron pipe	90
B0144	Assemble galvanized, black iron, or steel pipe	90
D0278	Locate and identify underground valves using base utilities maps	87
B0154	Assemble or disassemble plastic pipe fittings	87
B0156	Assemble or disassemble threaded pipe fittings	87
B0182	Guide backfill of trenches	83
D0300	Remove or install gate valves	83
B0179	Cut plastic pipe or tubing	80
B0186	Lower pipe into trenches manually	80
A0027	Drain excavations using pumps	80
D0277	Inspect valve boxes	80
E0356	Remove or install fire hydrants	80
E0346	Inspect fire hydrants	80
B0190	Ream piping or tubing	80
E0352	Locate water pipe leaks	77
B0147	Assemble plastic pipe using solvent weld joints	77

TABLE B2
GENERAL PLUMBER CLUSTER

TASKS		PERCENT MEMBERS PERFORMING (N=861)
B0167	Cut copper pipe or tubing	93
B0179	Cut plastic pipe or tubing	93
A0050	Maintain hand tools	91
B0190	Ream piping or tubing	90
B0188	Measure pipe	90
D0300	Remove or install gate valves	89
B0156	Assemble or disassemble threaded pipe fittings	89
B0144	Assemble galvanized, black iron, or steel pipe	89
A0052	Maintain shop equipment	88
B0142	Assemble copper tubing using sweat solder	87
A0057	Open clogged or restricted drains using power-operated augers	87
B0147	Assemble plastic pipe using solvent weld joints	86
B0169	Cut galvanized, black iron, or steel pipe, other than ductile steel pipe	86
A0056	Open clogged or restricted drains using hand-operated augers	85
B0203	Thread pipe using hand threaders	84
B0204	Thread pipe using mounted power threaders	84
B0154	Assemble or disassemble plastic pipe fittings	83
D0290	Remove or install ball valves	83
B0138	Assemble copper tubing using compression couplings	82
B0139	Assemble copper tubing using ferruled fittings	82
D0296	Remove or install faucets	82
A0043	Inspect plumbing fixtures	81
B0195	Remove or install pipe hangers or pipe straps	80
B0140	Assemble copper tubing using flared fittings	80
D0299	Remove or install gate valve components	79

TABLE B3
INTERIOR PLUMBING JOB

TASKS		PERCENT MEMBERS PERFORMING (N=218)
B0167	Cut copper pipe or tubing	96
D0296	Remove or install faucets	92
B0179	Cut plastic pipe or tubing	92
C0246	Remove or install urinals	91
A0056	Open clogged or restricted drains using hand-operated augers	90
B0190	Ream piping or tubing	90
D0327	Remove or install water closet tank float valves	89
B0142	Assemble copper tubing using sweat solder	89
D0328	Remove or install water closet tank flush valve components	89
A0057	Open clogged or restricted drains using power-operated augers	88
D0297	Remove or install flushometer valve components	88
A0050	Maintain hand tools	88
D0329	Remove or install water closet tank flush valves	88
D0295	Remove or install faucet components	86
C0238	Remove or install flushometer-type water closets	86
B0147	Assemble plastic pipe using solvent weld joints	85
B0144	Assemble galvanized, black iron, or steel pipe	85
B0139	Assemble copper tubing using ferruled fittings	84
C0248	Remove or install wall-hung sinks	83
C0249	Remove or install water fountain components	83
A0043	Inspect plumbing fixtures	83
A0086	Remove or install flushometers	83
B0156	Assemble or disassemble threaded pipe fittings	82
B0138	Assemble copper tubing using compression couplings	82
D0300	Remove or install gate valves	81

TABLE B4
NCOIC JOB

TASKS	PERCENT MEMBERS PERFORMING (N=41)
B0167 Cut copper pipe or tubing	98
T0980 Counsel trainees on training progress	95
B0188 Measure pipe	93
T0992 Maintain training records or files	88
T0987 Evaluate trainee progress on career development courses (CDCs)	88
T0979 Conduct on-the-job training (OJT)	88
A0050 Maintain hand tools	88
R0879 Set up or tear down tents	85
B0179 Cut plastic pipe or tubing	85
T0981 Determine training requirements	83
B0142 Assemble copper tubing using sweat solder	83
B0156 Assemble or disassemble threaded pipe fittings	83
D0296 Remove or install faucets	83
T0990 Evaluate progress of trainees	80
A0043 Inspect plumbing fixtures	80
B0190 Ream piping or tubing	80
B0204 Thread pipe using mounted power threaders	80
R0878 Set up or tear down ROWPUs	80
T0976 Brief personnel concerning training programs or matters	78
S0906 Determine or establish work assignments or priorities	78
S0904 Counsel subordinates concerning personal matters	78
V1041 Maintain shop equipment	78
A0052 Maintain shop equipment	78
A0057 Open clogged or restricted drains using power-operated augers	78
B0147 Assemble plastic pipe using solvent weld joints	78

TABLE B5
GENERAL PLUMBER JOB

TASKS	PERCENT MEMBERS PERFORMING (N=594)
D0300 Remove or install gate valves	94
B0179 Cut plastic pipe or tubing	94
B0188 Measure pipe	93
A0052 Maintain shop equipment	92
A0050 Maintain hand tools	92
B0156 Assemble or disassemble threaded pipe fittings	92
B0167 Cut copper pipe or tubing	92
B0144 Assemble galvanized, black iron, or steel pipe	92
B0190 Ream piping or tubing	91
B0169 Cut galvanized, black iron, or steel pipe, other than ductile steel pipe	90
D0290 Remove or install ball valves	90
B0203 Thread pipe using hand threaders	89
E0349 Locate water mains using base maps	89
D0293 Remove or install check valves	89
B0154 Assemble or disassemble plastic pipe fittings	88
B0147 Assemble plastic pipe using solvent weld joints	88
A0057 Open clogged or restricted drains using power-operated augers	87
D0269 Inspect gate valves	87
B0142 Assemble copper tubing using sweat solder	87
D0299 Remove or install gate valve components	87
D0278 Locate and identify underground valves using base utilities maps	87
E0352 Locate water pipe leaks	86
B0204 Thread pipe using mounted power threaders	86
B0165 Cut cast iron pipe	85
B0145 Assemble plastic pipe using compression-type fittings	85

TABLE B6

BAREBASE SYSTEMS INSTALLATION JOB

TASKS	PERCENT MEMBERS PERFORMING (N=7)
R0819 Disassemble HB, HE, or HF field shower units	100
C0238 Remove or install flushometer-type water closets	100
R0874 Set up HB, HE, or HF field latrines	100
D0297 Remove or install flushometer valve components	100
R0818 Disassemble Harvest Bare (HB), Harvest Eagle (HE), or Harvest Falcon (HF) field latrines	100
R0877 Set up water storage bladders	100
R0879 Set up or tear down tents	100
A0086 Remove or install flushometers	86
R0873 Set up HB, HE, or HF field shower units	86
A0057 Open clogged or restricted drains using power-operated augers	86
A0056 Open clogged or restricted drains using hand-operated augers	86
D0328 Remove or install water closet tank flush valve components	86
D0329 Remove or install water closet tank flush valves	86
D0296 Remove or install faucets	86
B0142 Assemble copper tubing using sweat solder	86
D0295 Remove or install faucet components	86
C0246 Remove or install urinals	86
B0167 Cut copper pipe or tubing	86
A0005 Adjust flushometers	71
R0875 Set up field water treatment systems	71
R0878 Set up or tear down ROWPUs	71
D0326 Remove or install water closet tank float valve components	71
B0179 Cut plastic pipe or tubing	71
A0050 Maintain hand tools	57
A0043 Inspect plumbing fixtures	57

TABLE B7

BAREBASE SYSTEMS MAINTENANCE JOB

TASKS	PERCENT MEMBERS PERFORMING (N=13)
R0873 Set up HB, HE, or HF field shower units	100
R0878 Set up or tear down ROWPUs	100
R0874 Set up HB, HE, or HF field latrines	100
R0879 Set up or tear down tents	100
R0875 Set up field water treatment systems	92
R0819 Disassemble HB, HE, or HF field shower units	92
R0818 Disassemble Harvest Bare (HB), Harvest Eagle (HE), or Harvest Falcon (HF) field latrines	92
R0813 Construct field latrines	92
R0841 Maintain HB, HE, or HF field latrines	92
R0842 Maintain HB, HE, or HF field shower units	92
R0877 Set up water storage bladders	92
R0821 Erect bare base structures	92
R0883 Troubleshoot ROWPUs	85
R0843 Maintain HB, HE, or HF water distribution systems	85
V1041 Maintain shop equipment	85
B0142 Assemble copper tubing using sweat solder	85
R0814 Construct field utility systems	77
R0833 Install ROWPU components, other than membranes	77
R0820 Disinfect water under field conditions	77
B0167 Cut copper pipe or tubing	77
R0817 Direct water flow through ROWPU filters	69
R0869 Remove or install ROWPU membranes	69
R0880 Tear down bare base structures	69
A0050 Maintain hand tools	69
R0807 Clean reverse osmosis water purification unit (ROWPU) components	62

TABLE B8
FIELD WATER SYSTEMS JOB

TASKS	PERCENT MEMBERS PERFORMING (N=12)
R0821 Erect bare base structures	100
R0879 Set up or tear down tents	100
R0827 Identify and report suspected unexploded ordnance (UXO)	100
R0875 Set up field water treatment systems	100
R0874 Set up HB, HE, or HF field latrines	100
R0873 Set up HB, HE, or HF field shower units	100
R0820 Disinfect water under field conditions	100
R0843 Maintain HB, HE, or HF water distribution systems	100
R0842 Maintain HB, HE, or HF field shower units	100
R0841 Maintain HB, HE, or HF field latrines	100
A0050 Maintain hand tools	92
R0877 Set up water storage bladders	92
R0878 Set up or tear down ROWPUs	92
R0819 Disassemble HB, HE, or HF field shower units	92
R0869 Remove or install ROWPU membranes	92
R0880 Tear down bare base structures	92
R0883 Troubleshoot ROWPUs	92
R0868 Remove or install HE water distribution systems	92
R0867 Remove or install HE water distribution system components	92
R0882 Transport emergency water	92
R0825 Harden shelters	83
B0188 Measure pipe	83
R0830 Inspect and report base damages	83
R0814 Construct field utility systems	83
R0818 Disassemble Harvest Bare (HB), Harvest Eagle (HE), or Harvest Falcon (HF) field latrines	83

TABLE B9

WATER TREATMENT TECHNICIAN JOB

TASKS	PERCENT MEMBERS PERFORMING (N=5)
H0434 Perform chlorine residual tests of water samples	100
H0457 Test raw water sources	100
R0835 Lay AM-2 matting	100
H0443 Perform pH tests of water samples	100
R0880 Tear down bare base structures	100
R0842 Maintain HB, HE, or HF field shower units	100
R0874 Set up HB, HE, or HF field latrines	100
R0877 Set up water storage bladders	100
R0875 Set up field water treatment systems	100
R0873 Set up HB, HE, or HF field shower units	100
T0979 Conduct on-the-job training (OJT)	100
R0813 Construct field latrines	100
B0158 Backfill trenches	100
V1041 Maintain shop equipment	80
B0188 Measure pipe	80
A0043 Inspect plumbing fixtures	80
H0456 Perform turbidity tests of water samples, other than swimming pool samples	80
R0883 Troubleshoot ROWPUs	80
E0339 Disinfect water lines	80
R0882 Transport emergency water	80
B0167 Cut copper pipe or tubing	80
H0433 Perform chloride tests of water samples	80
F0366 Backwash clean water treatment system filters	80
R0817 Direct water flow through ROWPU filters	80
R0841 Maintain HB, HE, or HF field latrines	80

TABLE B10
WASTEWATER TREATMENT JOB

TASKS		PERCENT MEMBERS PERFORMING (N=5)
F0383	Operate generators	100
I0473	Lubricate sewer lift pumps	100
J0507	Clean and drain flame traps	100
K0616	Perform total nitrogen tests of wastewater samples	100
F0375	Inspect water treatment lagoons	100
H0428	Collect and preserve water samples for chemical analyses at other agencies	100
A0108	Secure valves using lockout/tagout system	80
A0085	Remove or install equipment driving chain links	80
K0607	Perform phosphate tests of wastewater samples	80
K0609	Perform settleable solids tests of wastewater samples	80
G0406	Clean screens on water influent lines	80
H0436	Perform coliform bacteriological tests of water samples	80
C0215	Remove or install commercial emulsifier components	80
J0541	Inspect vacuum filters	80
J0579	Unclog plant sewer lines	80
K0622	Sterilize wastewater treatment testing equipment	80
H0452	Perform sulfite tests of water samples	80
J0552	Operate sludge presses	80
K0615	Perform tannin tests of wastewater samples	80
A0098	Remove or install septic tanks	80
I0471	Inspect sewer pipelines	80
D0272	Inspect plug valves	80
D0266	Inspect check valves	80
C0232	Remove or install domestic lavatory components	80
F0373	Inspect water storage tanks	80

TABLE B11
POOL MAINTENANCE JOB

TASKS	PERCENT MEMBERS PERFORMING (N=22)
G0413 Maintain chlorine level in swimming pools	100
G0405 Backwash swimming pool filters	100
G0416 Recirculate swimming pools	95
G0408 Clean swimming pool hair catchers	95
H0434 Perform chlorine residual tests of water samples	91
G0411 Drain or fill swimming pools	91
G0417 Remove or install swimming pool filtering system components	91
G0423 Winterize swimming pools	91
G0410 Direct water flow through filters	86
G0419 Super-chlorinate swimming pools	86
A0052 Maintain shop equipment	86
A0050 Maintain hand tools	86
A0037 Inspect chlorine storage and feeder equipment	86
G0421 Treat swimming pools with chemicals	82
H0443 Perform pH tests of water samples	82
G0403 Adjust pH in swimming pools	82
G0407 Clean swimming pool drains	82
A0001 Add chemicals to chemical feeders	82
A0014 Clean chemical feeders	82
G0409 Collect swimming pool water samples	77
V1041 Maintain shop equipment	77
A0079 Remove or install chlorine cylinders	77
F0376 Inspect water treatment system chlorine storage and feeder equipment	73
A0078 Remove or install chlorinator components	73
A0003 Adjust chemical feeders	73

TABLE B12
FIRE SUPPRESSION JOB

TASKS		PERCENT MEMBERS PERFORMING (N=8)
L0640	Inspect dry-pipe fire suppression systems	100
L0626	Clean fire suppression system valve enclosures	100
L0641	Inspect dry-pipe pneumatic air compressors	100
L0633	Identify leaks on dry-pipe fire suppression systems	100
L0634	Identify leaks on wet-pipe fire suppression systems	100
L0652	Inspect wet-pipe fire suppression systems	100
L0635	Identify and mark fire suppression system piping	100
L0685	Replace wet-pipe fire suppression system components	100
L0638	Inspect deluge fire suppression systems	100
L0673	Perform residual pressure tests on valves of wet-pipe fire suppression systems	100
L0670	Perform fire pump tests	100
L0674	Perform static pressure tests on valves of dry-pipe fire suppression systems	100
L0688	Reset dry-pipe fire suppression systems	100
L0675	Perform static pressure tests on valves of wet-pipe fire suppression systems	100
D0293	Remove or install check valves	100
L0643	Inspect fire suppression water tanks	100
L0703	Troubleshoot wet-pipe fire suppression systems	100
L0645	Inspect foam fire suppression system tanks	100
L0646	Inspect foam fire suppression systems for corrosion	100
L0686	Reset deluge fire suppression systems	100
L0650	Inspect preaction fire suppression systems	100
L0658	Install pressure switches	100
L0648	Inspect jockey pumps	100
L0668	Maintain jockey pumps	100
L0699	Troubleshoot dry-pipe fire suppression systems	100

TABLE B13
TEAM LEADER JOB

TASKS	PERCENT MEMBERS PERFORMING (N=6)
S0958 Prepare bill of materials requests	100
S0961 Retrieve work order data using WIMS	100
U1009 Input nouns to WIMS dictionary for CE material acquisition system (CEMAS)	100
S0902 Coordinate work activities with other CE shops	100
B0147 Assemble plastic pipe using solvent weld joints	100
B0188 Measure pipe	100
A0050 Maintain hand tools	100
B0204 Thread pipe using mounted power threaders	100
C0238 Remove or install flushometer-type water closets	100
B0203 Thread pipe using hand threaders	100
B0179 Cut plastic pipe or tubing	100
C0252 Remove or install water heaters	100
C0235 Remove or install emergency eyewashers	100
C0236 Remove or install emergency shower components	100
C0234 Remove or install emergency eyewasher components	100
V1044 Order parts using WIMS	83
S0905 Determine or establish logistics requirements, such as personnel, equipment, tools, parts, supplies, or workspace	83
S0906 Determine or establish work assignments or priorities	83
V1045 Pick up, deliver, or store equipment, tools, parts, or supplies, other than respirators	83
B0142 Assemble copper tubing using sweat solder	83
B0156 Assemble or disassemble threaded pipe fittings	83
B0169 Cut galvanized, black iron, or steel pipe, other than ductile steel pipe	83
B0167 Cut copper pipe or tubing	83
A0086 Remove or install flushometers	83
D0329 Remove or install water closet tank flush valves	83

TABLE B14
OJT TRAINER JOB

TASKS	PERCENT MEMBERS PERFORMING (N=6)
T0992 Maintain training records or files	100
T0976 Brief personnel concerning training programs or matters	100
T0980 Counsel trainees on training progress	100
S0891 Conduct supervisory performance feedback sessions	100
T0987 Evaluate trainee progress on career development courses (CDCs)	83
S0893 Conduct supervisory orientations for newly assigned personnel	83
T0990 Evaluate progress of trainees	67
T0981 Determine training requirements	67
T0975 Administer or score tests	67
S0906 Determine or establish work assignments or priorities	67
S0888 Conduct general meetings, such as staff meetings, briefings, conferences, or workshops	67
S0889 Conduct self-inspections or self-assessments	67
T0979 Conduct on-the-job training (OJT)	67
S0902 Coordinate work activities with other CE shops	67
T0986 Establish or maintain study reference files	50
T0978 Conduct formal course classroom training	50
S0937 Establish performance standards for subordinates	50
S0904 Counsel subordinates concerning personal matters	50
S0903 Coordinate work requirements with CE superintendents	50
S0973 Write recommendations for awards or decorations	50
V1039 Inventory equipment, tools, parts, or supplies	50
T0983 Develop training programs, plans, or procedures	33
S0952 Interpret policies, directives, or procedures for subordinates	33
S0910 Develop self-inspection or self-assessment program checklists	33
S0892 Conduct safety inspections of equipment or facilities	33

TABLE B15
MANAGEMENT AND SUPERVISORY JOB

TASKS	PERCENT MEMBERS PERFORMING (N=78)
S0905 Determine or establish logistics requirements, such as personnel, equipment, tools, parts, supplies, or workspace	95
S0973 Write recommendations for awards or decorations	95
S0906 Determine or establish work assignments or priorities	92
S0891 Conduct supervisory performance feedback sessions	92
S0893 Conduct supervisory orientations for newly assigned personnel	91
S0902 Coordinate work activities with other CE shops	90
S0904 Counsel subordinates concerning personal matters	90
S0888 Conduct general meetings, such as staff meetings, briefings, conferences, or workshops	88
S0972 Write or indorse military performance reports	87
T0976 Brief personnel concerning training programs or matters	87
T0981 Determine training requirements	87
S0945 Implement safety or security programs	86
S0892 Conduct safety inspections of equipment or facilities	86
S0938 Establish procedures for accountability of equipment, tools, parts, or supplies	85
S0886 Assign sponsors for newly assigned personnel	85
S0903 Coordinate work requirements with CE superintendents	83
S0943 Evaluate maintenance or utilization of equipment, tools, parts, supplies, or workspace	82
S0937 Establish performance standards for subordinates	82
S0942 Evaluate work schedules or work load requirements	81
S0940 Evaluate job hazards or compliance with Air Force Occupational Safety and Health (AFOSH) program	81
S0947 Initiate actions required due to substandard performance of personnel	79
V1033 Assign equipment, tools, or vehicles to personnel	79
S0912 Develop or establish work methods or procedures	78
T0980 Counsel trainees on training progress	77
S0967 Schedule personnel for temporary duty (TDY) assignments, leaves, or passes	77

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APPENDIX C

EXPANDED LISTING OF MODULES AND TASK STATEMENTS

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These Task Modules (TMs) were developed in order to organize and summarize the extensive task information of this specialty. The TMs were developed by clustering tasks which are co-performed by the same incumbents. Co-performance is a measure of how probable a task will be performed with another task, based upon the responses of surveyed personnel. For example, if an individual performs one Pipe and Tubing task, the probability is very high that he or she will perform other Pipe and Tubing. Thus, the group of Pipe and Tubing Duty tasks can be considered a "natural group" or associated or related tasks (see TM 0001 below). The statistical clustering generally approximates these "natural groupings."

The title of each TM is a best estimate as to the generic subject content of the group of tasks. The TMs are useful for organizing the task data into meaningful units and as a way to concisely summarize the extensive job data. However, TMs are only one way to organize the information. Other strategies may also be valid.

0001 Pipe and Tubing

- | | | |
|----|-------|--|
| 1 | B0138 | Assemble copper tubing using compression couplings |
| 2 | B0139 | Assemble copper tubing using ferruled fittings |
| 3 | B0140 | Assemble copper tubing using flared fittings |
| 4 | B0142 | Assemble copper tubing using sweat solder |
| 5 | B0144 | Assemble galvanized, black iron, or steel pipe |
| 6 | B0145 | Assemble plastic pipe using compression-type fittings |
| 7 | B0146 | Assemble plastic pipe using insert fittings |
| 8 | B0147 | Assemble plastic pipe using solvent weld joints |
| 9 | B0149 | Assemble plastic pipe using threaded joints |
| 10 | B0150 | Assemble slip-joint connections |
| 11 | B0151 | Assemble or disassemble flanged pipe and fittings |
| 12 | B0154 | Assemble or disassemble plastic pipe fittings |
| 13 | B0155 | Assemble or disassemble plastic tubing |
| 14 | B0156 | Assemble or disassemble threaded pipe fittings |
| 15 | B0161 | Bend tubing by hand |
| 16 | B0165 | Cut cast iron pipe |
| 17 | B0167 | Cut copper pipe or tubing |
| 18 | B0169 | Cut galvanized, black iron, or steel pipe, other than ductile steel pipe |
| 19 | B0179 | Cut plastic pipe or tubing |
| 20 | B0188 | Measure pipe |
| 21 | B0190 | Ream piping or tubing |
| 22 | B0203 | Thread pipe using hand threaders |
| 23 | B0204 | Thread pipe using mounted power threaders |
| 24 | B0205 | Thread pipe using portable hand-held power threaders |

0002 Drain Unclogging

- 1 A0005 Adjust flushometers
- 2 A0043 Inspect plumbing fixtures
- 3 A0056 Open clogged or restricted drains using hand-operated augers
- 4 A0057 Open clogged or restricted drains using power-operated augers
- 5 A0059 Open clogged or restricted drains using vacuum pressure/forced cup plungers
- 6 A0060 Open clogged or restricted drains using water pressure
- 7 A0086 Remove or install flushometers

0003 Valves

- 1 D0265 Inspect ball valves
- 2 D0266 Inspect check valves
- 3 D0269 Inspect gate valves
- 4 D0270 Inspect globe valves
- 5 D0289 Remove or install angle valves
- 6 D0290 Remove or install ball valves
- 7 D0291 Remove or install butterfly valves
- 8 D0292 Remove or install check valve components
- 9 D0293 Remove or install check valves
- 10 D0299 Remove or install gate valve components
- 11 D0300 Remove or install gate valves
- 12 D0301 Remove or install globe valve components
- 13 D0302 Remove or install globe valves
- 14 D0331 Repack valves

0004 Cut Openings

- 1 B0170 Cut openings in concrete structures using hand tools
- 2 B0171 Cut openings in concrete structures using power tools
- 3 B0172 Cut openings in masonry block structures using hand tools
- 4 B0173 Cut openings in masonry block structures using power tools
- 5 B0174 Cut openings in metal structures using hand tools
- 6 B0176 Cut openings in metal structures using power tools
- 7 B0177 Cut openings in wood structures using hand tools
- 8 B0178 Cut openings in wood structures using power tools

0005 Hydrants

- 1 E0333 Assemble fire hydrants
- 2 E0338 Disassemble fire hydrants
- 3 E0339 Disinfect water lines
- 4 E0342 Flow test fire hydrants
- 5 E0344 Inspect exterior water distribution systems for leaks

- 6 E0345 Inspect exterior water distribution systems for pressure
- 7 E0346 Inspect fire hydrants
- 8 E0356 Remove or install fire hydrants
- 9 E0359 Repair malfunctions in fire hydrant bonnet assemblies
- 10 E0360 Repair malfunctions in fire hydrant main valve assemblies

0006 Valve Boxes

- 1 D0277 Inspect valve boxes
- 2 D0279 Locate and identify underground valves using electronic devices
- 3 D0280 Locate and identify underground valves using probe method
- 4 D0286 Realign valve boxes
- 5 D0325 Remove or install valve boxes
- 6 D0332 Repair water main valves
- 7 E0351 Locate water mains using electronic devices

0007 Sewer Lines

- 1 I0463 Flush sewers
- 2 I0467 Inspect manholes
- 3 I0471 Inspect sewer pipelines
- 4 I0472 Locate leaks in sewer lines
- 5 I0475 Open clogged or restricted sewers using high-pressure water equipment

0008 Pipe Tapping

- 1 B0200 Tap pipe using hand taps
- 2 B0201 Tap pipe using saddles
- 3 B0202 Tap pipe using tapping machines
- 4 E0361 Tap water mains

Backflow

- 1 A0013 Clean atmospheric vacuum breaker backflow prevention devices
- 2 A0017 Clean doublecheck valve backflow prevention devices
- 3 A0022 Clean pressure-type vacuum breaker backflow prevention devices
- 4 A0023 Clean reduced pressure principle (RPP) backflow prevention devices
- 5 A0035 Inspect atmospheric vacuum breaker backflow prevention devices
- 6 A0038 Inspect doublecheck valve backflow prevention devices
- 7 A0045 Inspect pressure-type vacuum breaker backflow prevention devices
- 8 A0046 Inspect RPP backflow prevention devices
- 9 A0073 Remove or install atmospheric vacuum breaker backflow prevention device components

- 10 A0074 Remove or install atmospheric vacuum breaker backflow prevention devices
- 11 A0081 Remove or install doublecheck valve backflow prevention device components
- 12 A0082 Remove or install doublecheck valve backflow prevention devices
- 13 A0092 Remove or install pressure-type vacuum breaker backflow prevention device components
- 14 A0093 Remove or install pressure-type vacuum breaker backflow prevention devices
- 15 A0096 Remove or install RPP backflow prevention device components
- 16 A0097 Remove or install RPP backflow prevention devices
- 17 A0112 Test atmospheric vacuum breaker backflow prevention devices
- 18 A0113 Test doublecheck valve backflow prevention devices
- 19 A0117 Test pressure-type vacuum breaker backflow prevention devices
- 20 A0119 Test RPP backflow prevention devices

0010 Pressure Regulators

- 1 D0259 Adjust pressure regulator valves
- 2 D0274 Inspect pressure regulator valves
- 3 D0275 Inspect pressure relief valves
- 4 D0276 Inspect quick-opening valves
- 5 D0318 Remove or install pressure regulator components
- 6 D0319 Remove or install pressure regulators
- 7 D0321 Remove or install pressure-reducing valve components
- 8 D0322 Remove or install pressure-reducing valves

0011 Sprinkler System

- 1 A0039 Inspect lawn sprinkler heads
- 2 A0040 Inspect lawn sprinkler piping
- 3 A0041 Inspect lawn sprinkler timers
- 4 A0088 Remove or install lawn sprinkler heads
- 5 A0089 Remove or install lawn sprinkler timers
- 6 A0100 Remove or install sprinkler system components
- 7 E0334 Clean debris from lawn sprinkler heads

0012 Thaw Frozen Pipe

- 1 A0122 Thaw frozen pipe using electrical heaters
- 2 A0123 Thaw frozen pipe using electrical pipe thawers
- 3 A0124 Thaw frozen pipe using hot water and rags
- 4 A0128 Thaw frozen pipe using torches

0013 Swimming Pool

- 1 G0402 Adjust alkalinity in swimming pools
- 2 G0403 Adjust pH in swimming pools
- 3 G0404 Adjust turbidity in swimming pools
- 4 G0405 Backwash swimming pool filters
- 5 G0407 Clean swimming pool drains
- 6 G0408 Clean swimming pool hair catchers
- 7 G0409 Collect swimming pool water samples
- 8 G0410 Direct water flow through filters
- 9 G0411 Drain or fill swimming pools
- 10 G0413 Maintain chlorine level in swimming pools
- 11 G0416 Recirculate swimming pools
- 12 G0417 Remove or install swimming pool filtering system components
- 13 G0419 Super-chlorinate swimming pools
- 14 G0420 Test turbidity in swimming pools
- 15 G0421 Treat swimming pools with chemicals
- 16 G0423 Winterize swimming pools

0014 Fire Suppression System

- 1 D0267 Inspect drip checks on fire systems
- 2 L0624 Apply corrosion control to sprinkler heads
- 3 L0625 Calculate water flow of fire suppression systems
- 4 L0626 Clean fire suppression system valve enclosures
- 5 L0627 Clean inductors of foam fire suppression systems
- 6 L0628 Clean inside components of wet-pipe fire suppression systems
- 7 L0629 Clean restrictors of deluge fire suppression systems
- 8 L0630 Clean restrictors of dry-pipe fire suppression systems
- 9 L0631 Clean restrictors of foam fire suppression systems
- 10 L0632 Clean restrictors of preaction fire suppression systems
- 11 L0633 Identify leaks on dry-pipe fire suppression systems
- 12 L0634 Identify leaks on wet-pipe fire suppression systems
- 13 L0635 Identify and mark fire suppression system piping
- 14 L0636 Inspect booster pumps
- 15 L0637 Inspect cannons for proper operation
- 16 L0638 Inspect deluge fire suppression systems
- 17 L0639 Inspect dry-chemical fire suppression systems
- 18 L0640 Inspect dry-pipe fire suppression systems
- 19 L0641 Inspect dry-pipe pneumatic air compressors
- 20 L0642 Inspect fire suppression system heat actuating devices (HADs)
- 21 L0643 Inspect fire suppression water tanks
- 22 L0644 Inspect fixed-gaseous fire suppression systems
- 23 L0645 Inspect foam fire suppression system tanks

- 24 L0646 Inspect foam fire suppression systems for corrosion
- 25 L0647 Inspect foam fire suppression systems, other than for corrosion
- 26 L0648 Inspect jockey pumps
- 27 L0649 Inspect manual pull stations
- 28 L0650 Inspect preaction fire suppression systems
- 29 L0651 Inspect pressure surge tanks
- 30 L0652 Inspect wet-pipe fire suppression systems
- 31 L0653 Install fire suppression system main line valves
- 32 L0654 Install fire suppression system post-indicator valves
- 33 L0657 Install manual pull stations
- 34 L0660 Install tamper switches
- 35 L0661 Install or extend dry-chemical fire suppression systems
- 36 L0662 Install or extend dry-pipe fire suppression systems
- 37 L0663 Install or extend fixed-gaseous fire suppression systems
- 38 L0664 Install or extend foam fire suppression systems
- 39 L0665 Install or extend stand-pipe fire suppression systems
- 40 L0666 Install or extend wet-pipe fire suppression systems
- 41 L0667 Maintain foam fire suppression system tanks
- 42 L0668 Maintain jockey pumps
- 43 L0669 Paint fire suppression system hardware
- 44 L0670 Perform fire pump tests
- 45 L0671 Perform hydrostatic tests on internal fire suppression systems
- 46 L0672 Perform residual pressure tests on valves of dry-pipe fire suppression systems
- 47 L0673 Perform residual pressure tests on valves of wet-pipe fire suppression systems
- 48 L0674 Perform static pressure tests on valves of dry-pipe fire suppression systems
- 49 L0675 Perform static pressure tests on valves of wet-pipe fire suppression systems
- 50 L0676 Perform visual flow tests on fire suppression system fire pumps
- 51 L0677 Repair manual pull stations
- 52 L0678 Replace deluge fire suppression system components
- 53 L0679 Replace dry-chemical fire suppression system components
- 54 L0680 Replace dry-pipe fire suppression system components
- 55 L0681 Replace fire suppression system air dryer components
- 56 L0682 Replace foam fire suppression system components
- 57 L0683 Replace jockey pump components
- 58 L0684 Replace preaction fire suppression system components
- 59 L0685 Replace wet-pipe fire suppression system components
- 60 L0686 Reset deluge fire suppression systems
- 61 L0687 Reset dry-chemical fire suppression systems
- 62 L0688 Reset dry-pipe fire suppression systems
- 63 L0689 Reset fixed-gaseous fire suppression systems
- 64 L0690 Reset foam fire suppression systems
- 65 L0691 Reset preaction fire suppression systems

- 66 L0692 Reset stand-pipe fire suppression systems
- 67 L0693 Reset wet-pipe fire suppression systems
- 68 L0694 Test flame ionization units for operation
- 69 L0695 Test interior deluge fire suppression systems for flow
- 70 L0696 Test interior fire suppression systems for alarm operation
- 71 L0697 Troubleshoot deluge fire suppression systems
- 72 L0698 Troubleshoot dry-chemical fire suppression systems
- 73 L0699 Troubleshoot dry-pipe fire suppression systems
- 74 L0700 Troubleshoot fixed-gaseous fire suppression systems
- 75 L0701 Troubleshoot foam fire suppression systems
- 76 L0702 Troubleshoot preaction fire suppression systems
- 77 L0703 Troubleshoot wet-pipe fire suppression systems

15 Air Pressure Regulator

- 1 N0737 Adjust air pressure regulators
- 2 N0738 Clean air pressure regulator components
- 3 N0741 Remove or install air compressors
- 4 N0742 Remove or install air pressure regulator components
- 5 N0743 Remove or install air pressure regulators

0016 Altitude Valves

- 1 D0258 Adjust altitude valves
- 2 D0261 Clean altitude valves
- 3 D0264 Inspect altitude valves
- 4 D0281 Lubricate altitude valves
- 5 D0288 Remove or install altitude valves

0017 Supervisory / Management

- 1 S0888 Conduct general meetings, such as staff meetings, briefings, conferences, or workshops
- 2 S0889 Conduct self-inspections or self-assessments
- 3 S0891 Conduct supervisory performance feedback sessions
- 4 S0892 Conduct safety inspections of equipment or facilities
- 5 S0893 Conduct supervisory orientations for newly assigned personnel
- 6 S0902 Coordinate work activities with other CE shops
- 7 S0903 Coordinate work requirements with CE superintendents
- 8 S0904 Counsel subordinates concerning personal matters
- 9 S0905 Determine or establish logistics requirements, such as personnel, equipment, tools, parts, supplies, or workspace
- 10 S0906 Determine or establish work assignments or priorities
- 11 S0912 Develop or establish work methods or procedures
- 12 S0913 Develop or establish work schedules, other than using WIMS
- 13 S0937 Establish performance standards for subordinates

- 14 S0938 Establish procedures for accountability of equipment, tools, parts, or supplies
- 15 S0940 Evaluate job hazards or compliance with Air Force Occupational Safety and Health (AFOSH) program
- 16 S0942 Evaluate work schedules or work load requirements
- 17 S0943 Evaluate maintenance or utilization of equipment, tools, parts, supplies, or workspace
- 18 S0945 Implement safety or security programs
- 19 S0946 Initiate personnel action requests
- 20 S0947 Initiate actions required due to substandard performance of personnel
- 21 S0972 Write or indorse military performance reports
- 22 S0973 Write recommendations for awards or decorations
- 23 T0976 Brief personnel concerning training programs or matters
- 24 T0979 Conduct on-the-job training (OJT)
- 25 T0980 Counsel trainees on training progress
- 26 T0981 Determine training requirements
- 27 T0987 Evaluate trainee progress on career development courses (CDCs)
- 28 T0990 Evaluate progress of trainees
- 29 T0992 Maintain training records or files

0018 WIMS

- 1 U1007 Input actual hours and deviations on WIMS weekly work schedules
- 2 U1008 Input data for work orders using WIMS
- 3 U1015 Maintain WIMS automated daily work schedules
- 4 U1023 Prepare WIMS automated weekly work schedules
- 5 U1024 Prepare WIMS maintenance action sheets (MASs)
- 6 U1025 Report problems identified within WIMS
- 7 U1029 Update WIMS daily time records

0019 Training

- 1 T0988 Evaluate training methods or techniques of instructors
- 2 T0989 Evaluate effectiveness of training programs, plans, or procedures
- 3 T0991 Inspect training materials or aids for operation or suitability
- 4 T0993 Personalize lesson plans

0020 Water Sample Test

- 1 H0432 Perform carbon dioxide tests of water samples
- 2 H0436 Perform coliform bacteriological tests of water samples
- 3 H0440 Perform jar tests of water samples
- 4 H0441 Perform manganese tests of water samples
- 5 H0442 Perform nitrite tests of water samples
- 6 H0446 Perform settleable solids tests of water samples
- 7 H0447 Perform silicate tests of water samples

- 8 H0448 Perform sludge concentration tests of water samples
- 9 H0450 Perform sulfate tests of water samples
- 10 H0451 Perform sulfide tests of water samples
- 11 H0452 Perform sulfite tests of water samples

0021 Wastewater

- 1 J0490 Aerate wastewater
- 2 J0504 Clean sidewalls on sewage settling tanks
- 3 K0583 Calibrate wastewater treatment testing equipment
- 4 K0584 Check wastewater sample temperatures
- 5 K0587 Clean wastewater treatment testing equipment
- 6 K0588 Collect wastewater samples for local analyses
- 7 K0589 Collect and preserve wastewater samples for chemical analyses at other agencies
- 8 K0593 Perform biochemical oxygen demand (BOD) tests of wastewater samples
- 9 K0594 Perform chemical oxygen demand (COD) tests of wastewater samples
- 10 K0595 Perform chloride tests of wastewater samples
- 11 K0598 Perform dissolved solids (DS) tests of wastewater samples
- 12 K0599 Perform DO tests of wastewater samples
- 13 K0609 Perform settleable solids tests of wastewater samples

0022 Wastewater Sample Test

- 1 J0503 Clean sand filters on wastewater treatment systems
- 2 J0512 Flood trickling filters
- 3 J0519 Inspect digester water seals
- 4 J0521 Inspect drying bed underdrain systems
- 5 J0523 Inspect extended aeration activated sludge units
- 6 J0540 Inspect vacuum drying systems
- 7 K0592 Perform ammonia nitrogen tests of wastewater samples
- 8 K0597 Perform coliform bacteriological tests of wastewater samples
- 9 K0601 Perform mix liquor suspended solids (MLSS) tests of wastewater samples
- 10 K0602 Perform mix liquor volatile solids (MLVS) tests of wastewater samples
- 11 K0603 Perform nitrate nitrogen tests of wastewater samples
- 12 K0606 Perform phenol tests of wastewater samples
- 13 K0607 Perform phosphate tests of wastewater samples
- 14 K0608 Perform relative stability tests of wastewater samples
- 15 K0610 Perform settling rate tests of wastewater samples
- 16 K0612 Perform sludge volume index tests of wastewater samples
- 17 K0613 Perform stream surveys of wastewater samples
- 18 K0614 Perform suspended solids tests of wastewater samples, other than MLSS
- 19 K0615 Perform tannin tests of wastewater samples
- 20 K0616 Perform total nitrogen tests of wastewater samples
- 21 K0617 Perform total solids tests of wastewater samples
- 22 K0618 Perform turbidity tests of final effluent of wastewater treatment systems

- 23 K0619 Perform volatile acids tests of wastewater samples
- 24 K0620 Perform volatile solids tests of wastewater samples
- 25 K0622 Sterilize wastewater treatment testing equipment

0023 Demineralization

- 1 O0755 Inspect dual-bed demineralizers
- 2 O0757 Inspect mixed-bed demineralizers
- 3 O0759 Regenerate dual-bed demineralizers
- 4 O0764 Remove or install dual-bed demineralizer components
- 5 O0765 Remove or install mixed-bed demineralizer components
- 6 O0767 Rod out coils in thermocompression distillation units